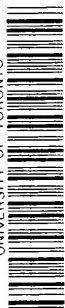


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Sincerely Yours
Wm Richardson

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DISCIPLES OF ÆSCULAPIUS

By SIR BENJAMIN WARD

RICHARDSON, M.D., F.R.S.

11

With a Life of the Author
by his Daughter . . .
MRS. GEORGE MARTIN

In Two Volumes

VOL. I.

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CONTENTS

OF

VOLUME I

	PAGE
LIFE OF SIR BENJAMIN WARD RICHARDSON, M.D., F.R.S. BY HIS DAUGHTER, MRS. GEORGE MARTIN	1
HARVEY AFTER DEATH	13
AN ÆSCULAPIAN POET—JOHN KEATS	20
THE FIRST ELECTRICIAN—WILLIAM GILBERT, M.D.	33
A GREAT MEDICAL REFORMER—THOMAS WAKLEY, M.P.	45
THE AMERICAN SYDENHAM—BENJAMIN RUSH, M.D.	62
VESALIUS AND THE BIRTH OF ANATOMY	76
HERMANN BOERHAAVE, M.D., AND THE ORIGIN OF SCIENTIFIC MEDICINE	95
ANTONY VAN LEEUWENHOEK, F.R.S., AND THE ORIGIN OF HISTOLOGY	108
WILLIAM CHESelden, F.R.S., AND THE NEW ERA OF BRITISH SURGERY.	128
ANTONIO SCARPA, F.R.S., AND SURGICAL ANATOMY	143
RICHARD WISEMAN AND THE SURGERY OF THE COMMON- WEALTH	158

	PAGE
AMBROSE PARÉ, AND THE BIRTH OF FRENCH SURGERY	176
JOHN MAYOW, M.D., LL.D., A NEGLECTED GENIUS	193
JOHN ARBUTHNOTT, M.D., F.R.S., THE MEDICAL SCHOLAR	205
JOHN SNOW, M.D., A REPRESENTATIVE OF MEDICAL SCIENCE AND ART OF THE VICTORIAN ERA	227
JOHN BROWN, M.D., AND THE BRUNONIAN SYSTEM	245
RICHARD MEAD, M.D., F.R.S.	262
JOHN BAPTIST MORGAGNI, M.D., F.R.S., AND THE BIRTH OF PATHOLOGY	283
RENÉ THÉOPHILE HYACINTHE LAENNEC, M.D., AND THE DISCOVERY OF MEDIATE AUSCULTATION BY THE STETHO- SCOPE	302
WILLIAM HUNTER, M.D., F.R.S., F.S.A.	322
JOSEPH PRIESTLEY, LL.D., F.R.S., AND THE DISCOVERY OF VITAL AIR—OXYGEN GAS	344
JOHN FREIND, M.D., F.R.S., THE MEDICAL HISTORIAN	362
EDWARD JENNER, M.D., F.R.S., A FORTUNATE ÆSCULAPIAN	381
SIR FRANCIS BACON AS A MASTER OF PHYSIC	402

ILLUSTRATIONS

IN

VOLUME I

	PAGE
SIR BENJAMIN WARD RICHARDSON	<i>Frontispiece</i>
HEMPSTEAD CHURCH	14
WILLIAM HARVEY	<i>facing</i> 16
HARVEY AFTER DEATH	16
BUST OF HARVEY IN HEMPSTEAD CHURCH	17
JOHN KEATS	<i>facing</i> 20
WILLIAM GILBERT	„ 36
WILLIAM GILBERT'S RESIDENCE AT COLCHESTER	43
THOMAS WAKLEY.	<i>facing</i> 48
BENJAMIN RUSH	„ 62
ANDREW VESALIUS	„ 76
HERMANN BOERHAAVE	„ 96
ANTONY VAN LEEUWENHOEK	„ 108
WILLIAM CHESELDEN	„ 128
THE BIRTHPLACE OF WILLIAM CHESELDEN	129

	PAGE
ANTONIO SCARPA	<i>facing</i> 144
RICHARD WISEMAN	,, 158
AMBROSE PARÉ	,, 176
JOHN MAYOW	,, 196
JOHN ARBUTHNOTT	,, 208
GARTH, ARBUTHNOTT, POPE, AND HOGARTH AT BUTTON'S COFFEE-HOUSE	216
JOHN SNOW	<i>facing</i> 228
JOANNES BRUNO (JOHN BROWN)	,, 248
RICHARD MEAD	,, 262
SKETCH OF MEAD BY HOGARTH	271
JOHN BAPTIST MORGAGNI	<i>facing</i> 284
RENÉ THÉOPHILE HYACINTHE LAENNEC	,, 302
WILLIAM HUNTER	,, 322
JOSEPH PRIESTLEY	,, 344
THE BURNING OF DR. PRIESTLEY'S HOUSE	,, 358
JOHN FREIND	,, 362
EDWARD JENNER	,, 384
SIR FRANCIS BACON	,, 402

Life of Sir Benjamin Ward Richardson, M.D., F.R.S.

BY HIS DAUGHTER, MRS. GEORGE MARTIN.

“Man is bound to expend every particle of strength which God Almighty has given him in doing the work he finds he is fit for, to stand up to it to the last breath of life, and to do his best.”—CARLYLE.

THE destiny of most men and women is more or less shaped for them. Could their careers be traced to their source it would be found that the influence which led them was apart from themselves, moulded by another's ambition, another's wish, and to have been infused into the infant mind at such an early period, that when that mind developed, itself moving and influencing its own course, the path it was to follow was so clear that the steps never halted, but marched away from childhood resolutely, with a settled purpose, to the goal ahead.

In the year of the Coronation (1838) this influence was brought home to a young boy at his mother's side. The boy, the only child of his parents, was strong and vigorous, the mother frail and dying, revealing to her son her ambition for him, and the profession he must follow, that “he must not only make sick people well, but he must keep the people that were well from becoming sick.” He was told of the battle that he must fight and win—a battle that must be prepared for through the remaining years of childhood, through boyhood, through manhood—a battle to be encountered without that mother's care in tender years, without her sympathy and love through life, for the mother must soon pass away and the little boy must be left behind. The mother passed away, and the boy remained in his motherless home to learn the lesson of a lonely

2 Sir Benjamin Ward Richardson, M.D., F.R.S.

youth, a lesson that stood him well in after-life, for it gave him the moral power to stand alone for his opinions, and the power of self-reliance, without which originality of thought is nipped in the bud by the frost of conventionality.

Benjamin Ward Richardson was "born to the profession of medicine" from the moment his eyes opened on All Hallows' Eve (October 31st), 1828, in the little village of Somerby, in Rutland. The impression, unconsciously received from his mother's mind in infancy, that medicine was to be the work of his life, and brought home to him in her dying days, was strengthened in him by his father's influence; it was deepened in him by his uncle, Mr. Price, a surgeon at Barrowden, where much of his boyhood was spent; the dignity of the profession was impressed upon him by an old doctor—Wing by name—who unfolded to him visions of the great Dr. Cheselden, who had lived hard by his own home and had attended Good Queen Anne. He would tell him of the use Cheselden had made of life in the noble profession he followed, spurring the young boy on to walk worthily in the path trodden by great men.

My father was educated with a view to medicine in very early years at Burrow Hill School, where the Principal, the Rev. W. Young Nutt, supervised and grounded him in general subjects, as well as those specially needed in medical life, Latin and Greek forming a prominent part. Although sport and pastime were encouraged in moments of relaxation, with the exception of cricket, my father took but little part in them; books of all kinds were the chief recreation which characterised his boyhood, and this was continued all through life. He fell asleep at night book in hand, and on a table by his side lay certain books to be read at the moment of waking. Biography was one of his favourite studies, and he always urged that it was the best method of acquiring knowledge on all subjects. To the early pursuance of biography at Burrow Hill School must be attributed much of the facility he acquired in after years, and the untiring interest he took, in collecting matter for and writing the memoirs of some of the great men of medicine who have thrown light and learning into the study of medical science and discovery. In writing these lives he spared neither time nor labour, and he was ever on the look-out for facts to note down for a "Life." He took pleasure in travelling long distances to see the birth-places and homes of those whose biographies he meant to write, either in the present or in the future, and he

would strive to obtain authentic and original facts from every available source.

A student as a boy, such he remained to the last day of his life, as ready to learn as he was to impart what he had learned. It has been remarked many times how plain he made abstruse subjects, and how willing he was to patiently explain the most elementary facts to any inquirers who sought his aid on matters of which he had made a life study. It was at Burrow Hill School, and afterwards while an articulated pupil to Mr. Henry Hudson, of Somerby, that a love of antiquarian pursuits developed in him. The neighbourhood was rich in ancient remains, and Mr. Hudson was as willing to interest his pupil in antiquity, or the mysteries of electricity, as he was to introduce him to the first case of small-pox the young student had seen. Mrs. Hudson pleaded that the introduction might be postponed until the lad was a trifle older, but the doctor was resolute—"the sooner the boy saw such cases the better"—and that was final. Master and pupil worked happily together; the pupil was drilled in medical observation and treatment, and, taking kindly to his lessons, upon one occasion was left, in the absence of his eccentric master, to attend by himself to the wants of the patients.

The year 1845 found my father in Glasgow, entered as a student in Anderson's University (now Anderson's College), at which David Livingstone was a student. There he studied under Dr. Moses Buchanan, Professor J. A. Easton, Professor Hannay, Professor James Lawrie, and other distinguished men of the day, including John Knox, the anatomist, author of *The Races of Men*.

It was during these student days in Glasgow that a new era opened in the practice of surgery, and my father was one of the first to witness in Scotland the administration of an anæsthetic for a surgical operation. Hitherto the greatest trial that had to be undergone in medical studies was in the operating theatre, where all students more or less shrank from the scene as an operation proceeded and the cry of the patient rang in their ears for rapidity. My father would often speak of the marvellous fortitude with which men and women alike submitted to the knife. To a body of Andersonian students assembled for lecture, the news that instead of a lecture they would be enabled at the Royal Infirmary to see an operation performed under an anæsthetic was an event never to be forgotten. The anæsthetic was ether,

4 Sir Benjamin Ward Richardson, M.D., F.R.S.

and among those who took part in the operation were Professor Lawrie, Professor Andrew Buchanan, Professor Moses Buchanan, and Dr. Fleming.

A severe attack of fever for a time cut short further medical studies. "The Irish Fever" epidemic had come to Glasgow; and first, as a student at the St. Andrew's Lying-in Hospital, and then filling the vacant place of a house-surgeon who had died at his post, my father mixed day and night with the fever-stricken people. While attending a woman in a court near by, he himself sickened with the plague, and for fourteen weeks was laid low by it. On his recovery, unable for a time to continue his active medical studies, and following the advice of Dr. Anderson, he returned to Rutland. For a brief space he lent assistance to Mr. Price of Barrowden, and then proceeded to Essex as "visiting assistant" to Mr. Thomas Browne at Saffron Walden. Here, too, he made a comparatively short stay, but during it he saw a good deal of the practical side of medical life, revelled in the local Museum of Natural History, and carried away with him some lifelong friendships.

The next field of action was Narborough, in Leicestershire, where he worked away under Mr. Dudley Hudson, a brother of his old friend Mr. Henry Hudson, of Somerby. It was decided that he should enter into partnership, when qualified, with Mr. Dudley Hudson and his partners; and this would have been carried out had it not been suggested, through the intervention of Professor Taylor, that he should bend his steps to the near vicinity of London to assist Dr. Willis, of Barnes, in his practice there. He left Narborough with the greatest regret, qualified in Glasgow by passing the Faculty of Physicians and Surgeons, and returned to England to work with a man of liberal mind and wide learning. Here, too, it was suggested that he should become a partner, but the suggestion was never carried into effect. At Mortlake, where he resided while with Dr. Willis, he built up, on a small scale, two institutions—a library and a laboratory; these moved with him, and were enlarged as years went on, and in them many hours were daily spent. In the library his literary taste grew; in the laboratory he worked out the beginnings of later scientific researches. While living at Mortlake he took the degree of Doctor of Medicine, and about the same time he first made the acquaintance of Professor (afterwards Sir Richard) Owen and other valuable friends. It was partly due to his medical experience here that he competed for the Fothergillian gold medal,

awarded to him by the Medical Society of London for an essay entitled *The Diseases of Children Before Birth*. There was a wide and various field open for observation in this district, not only among the large resident population of rich and poor, but among the gipsy tribes that in those days infested Barnes Common. Into the tents of these people my father was welcomed, and as a child I recollect how he would tell the story of the swarthy little gipsy children he used to know: of the little boy with an injured spine whom he removed to a London hospital, of how the child had grieved in the great wards for the blue sky, the sunshine and the fresh air of the common, of how he was prevailed upon to bring him back, and of how the boy, lying on a board, would in the mornings be carried outside the gipsy tent to lie all day in the open air basking in the sunshine, watching the healthy gipsy children play, listening to the birds singing, seeing the flowers bloom, and wishing in a sickly way to be well and strong again, until the day came when the board was freed from its burden, and the little boy freed from his pain; he had been carried into another and a more lasting sunshine.

In 1854 my father removed to London, and in this sphere he learned, laboured, and taught for over forty years. He entered at once into physician's practice, and became a Member of the College of Physicians, being elected to the Fellowship at a later date. His first public appointments were Physician to the Blenheim Street Dispensary, and to the Royal Hospital for Diseases of the Chest, then called the Royal Infirmary for Asthma, City Road. He occupied the Chair of Forensic Medicine attached to the Grosvenor Place School of Medicine, which at that time adjoined St. George's Hospital, and also delivered there the first course of lectures on Public Hygiene. Afterwards he held the Chair of Physiology, and later became Dean of the School. Much of his time then, as all through his life, was spent in medical practice. "Sometimes," he writes, "I would see as many as two hundred sick persons a day, and every class of disease common in an English community;" and one of his last acts on the day he was stricken with fatal illness was to visit a serious case at the London Temperance Hospital, to which he was Physician. Although active practice occupied his attention, preventive medicine held perhaps the most important place in his work and brought with it the friendships of the late Dr. William Farr, and the late Sir Edwin Chadwick, of whose labours for mankind he was ever mindful. As he was the first to deliver a course of lectures on Hygiene, so he

6 Sir Benjamin Ward Richardson, M.D., F.R.S.

was the first who brought out and edited a newspaper on the subject. The *Sanitary Review and Journal of Public Health* was his creation, together with the motto which was printed on the cover, "National Health is National Wealth." In 1862 he brought out as its successor the *Social Science Review*, and he laboured at it with untiring zeal. He was likewise one of the first to advocate the open-air system for consumptive patients, now so much in vogue. This treatment he set forth in a pamphlet entitled *The Hygienic Treatment of Pulmonary Consumption*. A suggestion which he made to prevent the spread of epidemic disease was that healthy workshops should be provided in which the "outside hands" of the working classes might labour, each in his own workshop, but quite apart from his or her home. The need of this was pressed upon him by finding in the course of a professional visit the material for clothing apparel thrown over children suffering from scarlet fever, while the parent, a tailor, in the same room was busily employed stitching away at his trade. He lost no opportunity in urging the necessity for the healthy housing of the people, for healthy recreations, for health-giving habits to be taught, and particularly to the children, whose interest he did his best to assist as a member for several years of the London School Board. When his term of office there came to an end, press of work compelled him not to stand for re-election.

He had a scheme for the drainage of the whole of England : the scheme was to lay the sewers by the sides of the railways, so that their contents should be carried from the towns and be available at all points for manuring the ground. In 1875 the Social Science Association held a Congress at Brighton, at which, as President of the Health Section, he read a paper entitled *Hygeia : a Model City of Health*, and he sketched in picturesque form an ideal city. Of this essay Mr. (afterwards Sir Edwin) Chadwick told him, "You have changed the nation's tastes, you have shut up drainpipes, and you ought to be prosecuted." On this subject, as on other reforms he advocated, he was called by his contemporary brethren "a dreamer." "What is your father's last hobby?" a medical man once asked me with a satirical smile. He lived to see many of his "dreams"—his "hobbies"—become principles that were carried out, not only in the construction of modern dwelling-houses, but by the change in the mode of life lived in those houses, proving Mr. Chadwick's sally to be correct.

When he declared that the death-rate ought to be reduced to ten

in the thousand he was laughed to scorn. Already progress has been made in this direction, leading to the hope that in the near future, by observation and obedience to the laws of health and sanitation, this result will be attained. Besides his medical and sanitary work, original research filled much of his time. His laboratory was a favourite resort with him, and in it he would often work late into the night. In early student days he had been much encouraged to work at original research by Professor Lawrie. While at Mortlake he made researches on gases, and his studies on anæsthetic narcotism led him to anticipate what he afterwards made practical, by means of the lethal chamber—the painless extinction of the lower animal life. In London he continued to investigate this subject. He introduced bichloride of methylene, methylic ether, and other anæsthetic substances, and was still labouring at the subject in recent days—striving to discover what he believed he was near to, an anæsthetic as safe as it was efficacious. He spent much thought and time on local anæsthesia, with the result of the introduction of ether spray. He also invented a knife so formed as to cut painlessly, and he did not shrink from experimenting with it upon himself, as in other researches. Among other therapeutic substances which he introduced into medical practice were peroxide of hydrogen, ethylate of sodium, the colloids and nitrite of amyl. He read a paper on nitrite of amyl at the meeting of the British Association at Newcastle-on-Tyne in 1866. At a later meeting at Bath, at which Bishop Colenso and David Livingstone were present, he again brought the subject forward, and afterwards had a friendly discussion with Livingstone about it in a talk over their old University.

The Astley Cooper prize was awarded to my father as the outcome of investigations he had made on coagulation of the blood. He carried out further researches on the blood, and as a result he was led to introduce the ammoniacal treatment of febrinous deposit with most satisfactory results. Another field of research in which the laboratory lent its aid was that of resuscitation. He held the belief that, provided the organs of the body were not destroyed by age, or the vital organs irreparably injured, death ought not to occur; and that, as in drowning, the apparently dead persons by artificial respiration and other known means employed are restored to life, so an art is to be discovered by which persons dying from other causes can be revived and live again in the flesh. He put his views, gathered from various

experiments, forward on this subject in the pages of his *Asclepiad* for 1885.

In the year 1866 some alcoholic beverages came before my father for investigation, and while experimenting with them in his laboratory he became aware that alcohol lowered the temperature of the body. With so astounding a revelation he pursued the study of alcohol and its effects on the body. Each experiment proved not only its utter uselessness as "a food," but the ill effects it may, and does have, on the human body. It was a research of several years, carried on with the prejudice of early training strongly on the side of alcohol, but *facts* would not be turned aside; each experiment became more clear and decisive, and proved to his mind that the administration of alcohol in sickness was unwise, not to say in many cases disastrous, that alcohol was the origin of numerous diseases, and that abstinence from it was the wisest course to follow in regard to a stimulant with so vital an effect on the animal structure. Once convinced of his ground he broke away from the old trammels of prejudice and custom on this matter. His first disciple was himself. Accustomed to take wine at his meals, he took it no more; he had it removed from his table once and for all, and then, with his usual wish to extend what he believed to be the truth, he did not "hide his talent in the earth," but desired to make disciples of other men. The effect of his convictions on his medical friends and compeers, now over twenty years ago, may be interesting to relate as showing the almost childish feeling that was evinced. I quote it in his own words:—"In a city in which I once gave a demonstration on chloral a grand supper was spread for me; an eminent medical citizen was in the chair, and I was toasted with highest honours by one of the largest and liveliest assemblies I have ever seen. A few months later—it was by accident—I happened to be present at an important ceremony in the same city, meeting the same men; but I was marked . . . with the sin of disbelief in the ancient faith, and was known by only one friend. . . . I had done none of them a shadow of wrong, and I had left them all in peace and happiness; but I had let nature lead me, and was no longer one of them. Such has been the effect of my altered views for many a long year; it was no more than might have been expected, and no more than has had to be gently tolerated." A man who dared to advocate such principles must suffer for them. Suffer my father did, but I have often been struck

by the manner in which he took this change in the attitude of his medical contemporaries; it awoke no bitterness in him, neither did it make him swerve from his path. Attack, fashion, custom, public opinion had no power to move him when reason and conviction were at his back; once assured of a thing he stuck to it through thick and thin. He was one of the most resolute men I have ever known, and one of the most generous to those who differed from him in opinion, as well as to those who were his enemies. I recollect a medical man coming to seek his help—a man who had previously gone to a meeting with the settled purpose of attacking him in a speech he was about to make. The attack was carried out with much vigour, and in the rudest language permissible in a medical society; but when that man sought his help my father was ready to do all in his power to get him reinstated in the position from which he believed him to have been unjustly removed. It was in the same spirit that my father met his medical opponents on the subject of alcohol; their ungenerous behaviour to him awoke no resentment towards them. In his teaching of total abstinence, both in writing and speaking, he dealt solely with the physical side of the question; there were plenty, he said, to deal with the question, morally, in the ministers of all forms of religious thought. Looking back, it seems incredible that the medical profession should have looked upon total abstinence with so much disfavour. Medical opinion and public opinion to-day look on the subject from a wider and more liberal standpoint, and will probably say, with a physician to whom I related the attitude taken over twenty years ago, "Impossible!" Not impossible then, but let us hope impossible to-day.

In his busy life my father found time to speak publicly on several subjects. He gave his first address when little more than a youth; his last he delivered at Sion College, London, in November 1896. In 1868 he delivered lectures, with demonstrations, on his original work in his own house to audiences of medical men, and he constantly lectured in all parts of the United Kingdom, including a tour through Ireland in 1877. Whatever might be his subject, he spoke because he had a message to be delivered on what he believed to be the advancement of medicine, sanitation, total abstinence, or any other subject tending to the good of humanity.

In literature he wrote with the same object, save when he indulged in some poetry or fiction, "by way of recreation," as he would say. He wrote several plays, but completed one novel only,

The Son of a Star, a semi-historical story drawn in the first century. Most of his writings dealt with medicine, sanitation, hygiene, biography, or total abstinence. Among his works were *The Coagulation of the Blood*, *The Medical History of England*, written in early days, *Diseases of Modern Life*, *The Field of Disease*, *Vita Medica*, an unpublished volume of *Medical and Other Reminiscences*, *Health and Life*, *The Commonhealth*, *Woman as a Sanitary Reformer*, *Salute Land*, *A Ministry of Health*, *The Temperance Lesson-Book*, and the *Cantor Lectures on Alcohol*. He edited several works, among them being *The Health of Nations*, a book by the late Sir Edwin Chadwick. He also wrote eleven volumes of a medical book, which he brought out in quarterly numbers, *The Asclepiad*, where from time to time he dealt with all subjects relating to the advance of medicine in the present day.

Not only did my father seek the welfare of his fellow-creatures, but he sought to diminish the sufferings of the lower animal kingdom. With this object he was always, when he could "find time," experimenting in order to obtain from vegetable substances, by scientific processes, a perfect equivalent for animal food which would abolish the sacrifice of life in the lower animals. Cruelty of any kind was abhorrent to him. Corporal punishment in schools he fought against, from the strong evidence in those who had been brought to him in the course of his life suffering from its results, as well as from its morally degenerating action. Capital punishment, as well as corporal punishment, he looked upon as inhuman in our days of civilisation; and I have heard him say he should like to enter Parliament and have the honour of moving its abolition in the United Kingdom. He believed that it did not deter from crime, and the fact that there were instances on record of its infliction on the innocent should suffice to secure its abolishment.

In 1893, my father stood for Parliament, contesting the Walton Division of Liverpool in the Liberal cause. He fought a hard fight, but lost the day. "I think I shall win," he wrote, "but do not be disappointed if I do not. I shall not be. My one desire is to be at home again with you all." He was strongly attached to his home, and of late years went out socially but little. He had no time for it, he would say. One function, however, he always endeavoured to attend—namely, the gatherings at dinner once a month during the winter of "Noviomagus," a club of which he was President, and which was composed of Fellows of the

Society of Antiquaries. He was presented with the Fellowship of that Society, and among other distinctions bestowed upon him were the Fellowship of the Royal Society and the LL.D. of St. Andrews. He held the position of Assessor for the General Council in the University Court at St. Andrews for some years. The Imperial Leopold-Carolina Academy of Natural Sciences (Dresden) enrolled him in its ranks, as did also the Academy of Physiological Sciences of Turin, the Società Italiana d'Igiene, the Société d'Hygiène Publique of France, and the Philosophical Society of America. In earlier medical years, six hundred of his medical contemporaries presented him with a microscope and a purse of a thousand guineas as an acknowledgment of his services to medical science. He was knighted in 1893.

In reviewing my father's life for a moment, the many subjects which absorbed him come to mind coupled with the sanguine industry with which he pursued them. The most prominent feature in him was work, helped by the physical strength he was endowed with. "Tired? I am never tired, I do not know the meaning of the word tired," was his reply to a question at the end of a long day, in which he had carried out the principle contained in his own utterance, "Make the sun your fellow-workman." It was true; he seemed to bring energy into a room whenever he entered it, and even in failing bodily health his mental energy never left him. "I have much to do," he would say when urged to rest, "and little time to do it in." Death, which he had striven to keep off in others, he recognised as it approached him. "I have learned to meet calmly every emergency in life," he said, "now I must learn to meet death." His one wish was that when he could no longer work he might no longer live. The wish was granted. On November 19th, 1896, he rose at his usual time; he spent the day actively. He returned in the afternoon from the Temperance Hospital, and called his secretary to the library.

"Take your pen, please: I will add another chapter to *Vita Medica*"—the last book he was at work on. "Head the page 'A Last Word.'" He then dictated a few lines.

"Yes, Sir Benjamin?"

"That is all—the book is finished."

The book was finished—the *Vita Medica* of the author was finished too—the mortal life was almost run. Two hours later he was seized with apoplexy, and sank two days later without having regained consciousness.

My father did not realise his ideal as to the course life should run. He believed that it should fade from its zenith as unconsciously as it rose, and should set in second childhood. Against the death of the young, the vigorous, or the powerful, reason revolts and seems to tell us it is unnatural. Does not nature cry that before death demands life, the life-work should be finished, the eye should have grown dim, the intellect should have become hazy, the affections obtuse, and the animal mechanism so weak that the spirit within it is anxious to be freed from its enfeebled fetters?

Where then would be sorrow, when that which is natural had come to pass?

M. S. RICHARDSON MARTIN.

DISCIPLES OF ÆSCULAPIUS.

Harvey after Death.

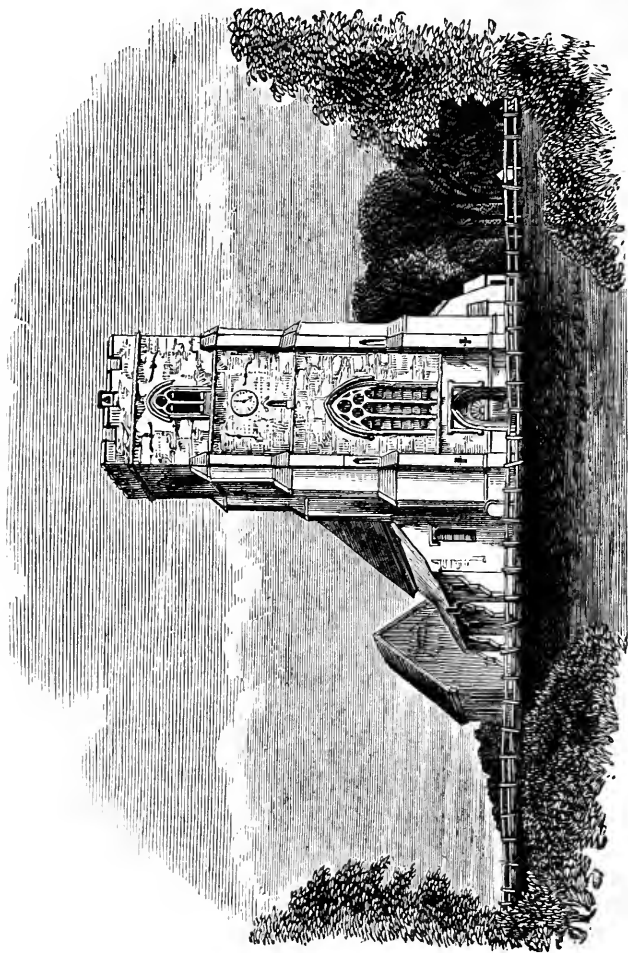
THE re-interment of the remains of the illustrious William Harvey, the final discoverer of the circulation of the blood, on the 17th of October, 1883, was an event in the medical history of this country.

On the 3rd day of June, 1657, about ten in the morning, Harvey, then in his eightieth year, found, on attempting to speak, that he had lost the power of utterance ; that, in the language of the vulgar, he had the "dead palsy" in the tongue. He had not, however, lost his mental faculties. He made signs to Sambroke, his apothecary, to bleed him from a vein under the tongue. Knowing that his end was near, he sent for his nephews, to each of whom he gave some token of his remembrance, his watch to one, his signet ring to another. On the evening on which he was smitten he died, the palsy giving him an easy passport. He went down with the sun. The precise place is not known : it was probably in the city of London.

From June 3rd to June 26th, a period of twenty-three days, was the time that elapsed between the death and the first burial of Harvey in the vault of the Harvey Chapel, then recently built by Eliab, the brother of our anatomist, at the church at Hempstead, in Essex. Hempstead is an ancient village, about seven miles south-east of Saffron Walden, near a river called the Pant. There are in the parish about 170 houses. Near by was Winchlow Hall, a long time the seat of the Harveys after William Harvey's death. Hempstead church was, until 1882, a beautiful structure. On Saturday, January 28th of that year, the splendid tower fell,

and the place became a ruin, but the Harvey Chapel remained entire.

There was for a long period of time a famous oak tree in the



HEMPSTEAD CHURCH.

parish of Hempstead. It was known as the Hempstead oak, and was of enormous size. I remember it in its last days. It is now gone, under process of gradual decay.

In a more savage day than ours, bull baiting was the grand

sport in Hempstead, and a famous "ring" was frequented there. The ring remains in good preservation, though the baiting has ceased. One fine Sunday afternoon in 1882, driving to Hempstead with a party of antiquarians, I found the "ring" occupied by a body of Primitive Methodists, who had turned it into a temporary chapel. While my comrades were in the churchyard a little way above, I stole back to look at this assembly, so strangely placed. The scene was extremely picturesque. The trees which fenced the ring formed by their boughs the roof of the extemporized sanctuary. The preacher, I think, had been a woman, who in the centre of the group stood bare-headed, with a scarlet tippet over her shoulders, closing the service with the hymn beginning,

"Before Jehovah's awful Throne."

They were singing the last verse, and she, using her hymn-book as a baton, was leading with much energy the words:—

"Wide as the world is Thy command,
Vast as eternity Thy love;
Firm as a rock Thy truth shall stand
When rolling years shall cease to move."

They all sang in good tune, doubling the word "eternity" with tremendous emphasis; and I thought they occupied right well the ground where the savages once raved at the dogs and baited the bull.

I beg pardon for a digression. I was observing upon the chapel which Eliab Harvey constructed in connection with the church at Hempstead, and the vault beneath the chapel in which the remains of William Harvey were first laid.

In the twenty-three days between the death and the first burial, many things had to be done. The case or shell had to be constructed. The body had probably to be embalmed. The body had to be carried from London to Hempstead. And one other thing had to be done of which I shall speak more particularly a little further on.

The case in which the body was laid is best described in the words of our learned Harveian Librarian at the College of Physicians, Dr. Munk, who defines it as a "mummy chest," made of lead. It was a rough outline of the body. It was six feet three inches long. It was one foot nine inches broad across the shoulders, one foot four inches across the pelvis, seven inches at the feet. It was seven inches deep on an average, being deepest at the breastplate, *viz.*, ten inches there. On the upper surface of the chest was a

Harvey after Death

breastplate measuring twelve inches by eight. On the breastplate was inscribed in quaint capital letters :—

DOCTOR
WILLIAM ◇ HARVEY
DECESED ◇ THE ◇ 3 ◇
OF ◇ JVNE ◇ 1657.
AGED ◇ 79 ◇ YEARS.

The case was very much larger than the body of Harvey, who was a small man, not much over five feet, and of slender build.

The body was borne out of London towards Essex, followed by the President, Dr. Alston, and many Fellows of the College of



HARVEY AFTER DEATH.

Physicians in their robes and gowns: how many went and how far they went beyond the city walls we do not know. The *cortège* would probably go first to Epping, then to Bishop's Stortford, and next to Thaxted—at that day a considerable place—or to Saffron Walden, and so on to Hempstead.

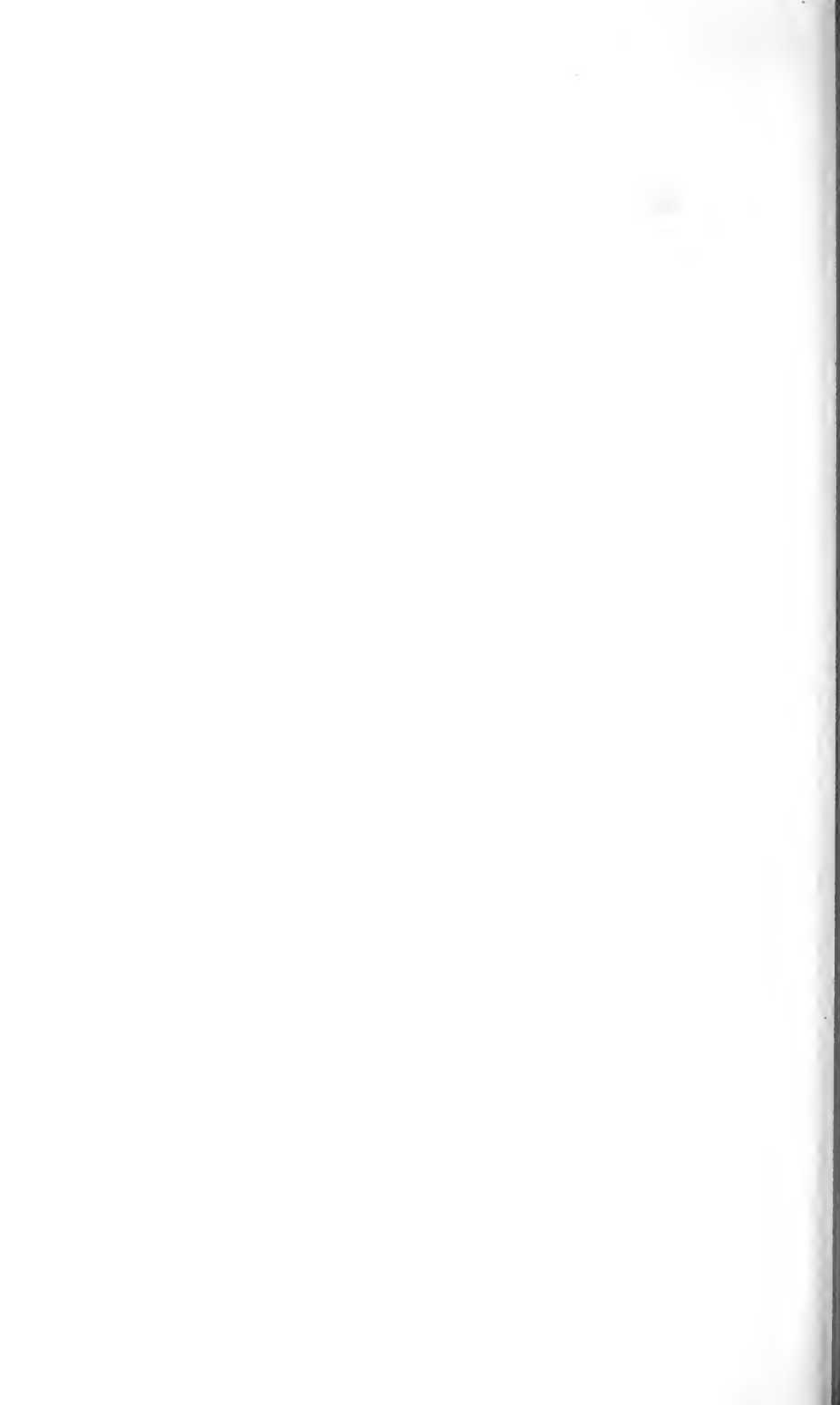
The antiquary and historian John Aubrey was at the funeral, and helped to carry the body into the vault. Aubrey says, "He (Harvey) was lapt in lead, and on his body in great letters his name, Dr. William Harvey."

In the vault the remains so left remained from June 26th, 1657 to October 17th, 1883. They underwent at last great risk of perishing. In 1847 I found the case or chest containing the remains lying among a number of chests, with coffins, containing other members of the Harvey family. I often repeated my visits



WILLIAM HARVEY.

After Van Dyck.





BUST OF HARVEY IN HEMPSTEAD CHURCH.

during thirty-five years ; and two years ago, at my instance, the Royal College of Physicians undertook the task of preserving the remains

from further chance of decay, as the result of exposure to wet and air. The work undertaken by the College was completed on the day of re-interment above named, October 17th, 1883, when eight of us, Fellows of the College, carried up the repaired leaden case containing the remains out of the vault, and placed it in a sarcophagus of Sicilian marble in the Harvey Chapel. Then the President of the College, Sir William Jenner, having laid the works of Harvey and a scroll with other records upon the leaden case, the sarcophagus was closed.

I have a longer history of all the details connected with this event, but that may rest in order that I may at this moment enlarge on the topic which forms the heading of this study, Harvey after death.

In the church at Hempstead, on the northern wall close to the Harvey Chapel, there is a bust of Harvey, which was put up soon after his death. It is a marble bust. The head is surmounted with thick, clustering locks, the face is well chiselled. One day, when I was in the church, I began to speculate at what period in the life of Harvey the bust was taken. In all the pictures I had seen of him he was represented as having very little hair on his head, and this luxuriance puzzled me. At last, by a sudden inspiration, I saw what had happened. The face appeared to me as the face of an aged man in death. I felt convinced that after death, some rude sculptor had worked from a cast of the dead face, and had added the rest out of his own ideas. I was the more assured of this the more I looked. To be completely satisfied, however, on returning home I asked our English genius of Sculpture, Thomas Woolner, R.A., to go with me to look at the bust. He did so most kindly and promptly, and confirmed my view. "With the cast of the face for his copy," says Mr. Woolner, "the sculptor has shown true artistic delineation; but all that he has been obliged to add to make up the bust as it stands is of the worst possible quality."

To separate the cast of the face from the artificial additions, I had a photograph taken in such a way that the face alone was seen in profile. This view was transferred to wood and was published in the *Lancet* of Nov. 30th, 1878, in my essay there on the remains of Harvey. By the kind permission of Dr. Wakley, I am enabled to reproduce the plate here.

In this delineation the reader will find himself face to face with Harvey, as Harvey, in his eightieth year, lay dead. In the Hunterian Museum at Glasgow—William Hunter's—there is an oil

painting of Harvey, the work of a painter named William van Bommel.

As that painter was born in 1630, and Harvey died in 1657, the "picture must have been taken from a sitting" when the sitter was near the time of his death. The picture tallies with the likeness from the bust nearer than any other painting we have of our immortal discoverer.

A quiet, placid, beautiful face, even in death, this of Harvey. The dark eyes which Aubrey comments on flash no more. The expression, quick even to fierceness in young life, carries with it here that melancholic repose which Dr. Ent not many years before had observed, when, after inquiry of Harvey if it were all well with him, he had received for answer, "How can it whilst the Commonwealth is full of distractions, and I myself am still in the open sea? And truly did I not find solace in my studies, and a balm for my spirit in the memory of my observations of former years, I should feel little desire for longer life. But so it has been that this life of obscurity, this vacation from public business, which causes tedium and disgust to many, has proved a sovereign remedy to me."

Now on the face we look at sits the eternal rest, when Commonwealths no longer distract, and when there is no more sea.

An Æsculapian Poet—John Keats.

IN the years 1813-14, when Mr. Astley Cooper was rising towards his zenith, and when Bright was a medical neophyte fresh from Cambridge, there lived in the Borough as students of Guy's and St. Thomas's, three young men, who occupied the same rooms, and who seem to have enjoyed their lives together as only men in the spring of life can. Their names were John Keats, Henry Stephens, and George Wilson Mackereth. The two last-named lived on to a ripe age; the first died in his twenty-sixth year—died at Rome on February 3rd, 1821, of consumption, under circumstances of some romance, as the world fancies. A poet he—John Keats the poet—the man who, by writing one immortal line, placed himself for ever before his kindred speaking his tongue, even though they knew nothing else about him, his life, his work, his death. The two companions of the poet, whose names I have just written, Stephens and Mackereth, were both known to me. Mr. Stephens I knew well, knew as one of my dearest friends for eight years, namely from 1856 to his death in 1864. Mr. Mackereth, whose daughter Agnes married Mr. Stephens' eldest son, the present Mr. Henry Stephens, of Avenue House, Finchley, I also knew, but less intimately.

My dear friend Stephens was never weary in telling me about Keats. The two students had allied sympathies. Both were pursuing medicine when they lived together, and both left it, after entering it, to follow other pursuits. Both were touched with poetic fire, and from a drama, *Edwy and Elgiva*, written by Stephens in his early days, I expect that had he not been led into other and more remunerative lines, he, too, would have ranked as a poet. He had imagination, original observation, industry. In medicine he was proficient. We are indebted to him for an excellent work on



Yours affectionately
John Keats.



Hernia, and for the introduction of creosote into medical practice as a therapeutical agent.

John Keats is our man now, on whose life we will for a moment refresh our memories, and whose short life's labour we will contemplate; happily a sweet contemplation, though planted in much sorrow; a paradise of beauty in a wilderness of despair.

It is fortunate for this task that the basis on which it may be laid is good. With truly loving and artistic hand, with conscience, with prescience as to the future of his author, Mr. H. Buxton Forman, himself of medical parentage, has in four handsome volumes brought together all that is up to this time known reliably of our Æsculapian poet, his life, letters, sayings, poems, with commentaries and elucidations, which bring the youth straight to the reader. Such mastery of details with concealment of ungrudging toil is here combined, that when the volumes have been carefully read, it is as if, after infinite wanderings above, below, around, in search of the poet, the biographer had literally found the man, and brought him personally to introduce him and his greatness. You almost put out your hand, hoping to grasp that of Keats in life before you, and ask him, "How are you, old friend?" as you rise from the books, after closing up with the delicate and perfect preface which supplies the biographer's motive, and indicates his accomplished duty.

To get at the poet through these handsome volumes it is readiest to begin with the last volume, and read that first. In the last volume there is an appendix, in which Leigh Hunt, Benjamin Haydon the painter, Cowden Clarke, George Keats, and Joseph Severn, who was with Keats at his death, with others of less knowledge of the man, give their histories of him. The records thus collected and gathered from such various channels are remarkable in that they generally agree in analysis of character and personnel. They agree, too, I may add, most closely with the views respecting the poet which Mr. Stephens conveyed to me between 1856 and 1864.

The portrait presented of Keats on the plate which accompanies this biography, and kindly lent to me by Mr. Buxton Forman, in whose possession is the original, brings the poet before us in his twenty-third year. The face tells its own story, all that can be read from physiognomy. With this it should be recorded that the stature of the man was small, and the body, although well-shaped, delicate. Mr. Stephens remembered him as being called by his fellow-students "little Keats," he being, at his full growth, no more than five feet

high. In the lecture-room he seemed to sit apart—I am retailing Mr. Stephens' recollections—and to be absorbed in something else, as if the subject suggested thoughts to him which were not practically connected with it. He was often in the subject and out of it, in a dreamy way. He never attached much consequence to his own studies in medicine, and, indeed, looked upon the medical career as the career by which to live in a work-a-day world, without being certain that he could keep up the strain of it. He nevertheless had a consciousness of his own powers, and even of his own greatness, though it might never be recognised—an idea which he maintained, though it may seem a paradox, to that almost last moment of his frail physical existence when he dictated his own epitaph,

“ Here lies one whose name was writ in water,”

as if, knowing his earthly immortality, he doubted that he had impressed it on the world. Amongst his fellow-students Keats was respected, and, by a few, loved. Leigh Hunt's after description of him as “ a mighty soul in a little body ” was understood long before by his medical contemporaries. Not only this ; the little body was filled with courage, too, or, vulgarly speaking, pluck, which showed itself once in a fair fight with a big butcher lad, who, lubberly and faint-hearted, got a thrashing from the small poet which he would not soon forget.

To the dreamy, courageous, gentle, mighty spirit in the little body many things were at times sore to bear. The love of beauty inborn, and which made this poet of the beautiful what he was, was not all satisfying. Like Akenside, he was touchy on the subject of his parental origin. He need not have been. His father, who was killed by a fall from his horse when the poet was a schoolboy, was a natural-born gentleman, handsome in feature and figure, honourable in all his dealings with the world, wise, prudent, and so much liked that his visit to the school at Enfield, where his boys were educated—school kept by the eminent and excellent John Clarke—seems always to have been looked on as an event of pleasure. His mother, who also died young, of consumption following upon rheumatism, was a handsome, an intelligent, and a good mother. And the poet loved them both with all his heart. But the father was, unfortunately, a livery stable-keeper under Mr. Jennings of the “ Swan and Hoop,” on the pavement in Moorfields, opposite the entrance into Finsbury Circus, and the mother was the daughter of Mr. Jennings, the proprietor. After the death of Jennings, Keats

senior continued the proprietorship of the stables, and there his wife gave birth to all his children.

In the medical schools this origin of the student poet was well known, and though doubtless it was as good as that of many others there, and better than some, it seemed, as Keats too sensitively thought, to use Mr. Stephens' words, "to stick to him." Later on in life it still evidently bit, and made him touchy even towards Shelley, as towards one of better blood.

Returning to the last volume of the Forman edition, and rapidly reviewing the life presented there, we find that Keats was born at the address already given on October 31st, 1795, the eldest of a family of four, consisting of himself, John, brother George, brother Thomas, and sister Fanny who is still alive. In 1803, one year before the death of his father, and four years before the death of his mother, he goes to Mr. John Clarke's famous Enfield school, remains at school there until 1809, and then, apparently not by his own choice, but by the will of his guardian, Mr. Abbey, is articled to Mr. Thomas Hammond, a surgeon practising at Church Street, Edmonton, two miles from Enfield. His terms of apprenticeship would be for five years, but perhaps were not carried out to completeness, for he and Hammond quarrel, and he, it may be gathered from his own words, even shows fight with his master, and leaves him rather abruptly. He has touched poetry by this time, has translated the *Æneid*, written in imitation of Spenser, and given wings to imagination. Leaving Hammond, but not leaving physic, he enters, in 1813-14, as a student to the then combined school of Guy's and St. Thomas's, and continuing to develop poetry there, writes aptly enough an ode and hymn to the god of physic and of song, Apollo. In 1815-16 he is the friend of Leigh Hunt, editor of the *Examiner*, and publishes his first poem in that newspaper. In 1816 he is introduced to Haydon the painter, and becomes the intimate of Charles Wentworth Dilke, Severn, and other celebrities. In 1817 he publishes his first volume of poems, dedicated to Hunt, and in the same year, during part of which he resides at the Isle of Wight, Margate, and Leatherhead, he commences his poem of *Endymion*. In the autumn of the same year, 1817, he visits a friend, Bailey by name, at Oxford, and in that visit runs loose, and pays a forfeit for his indiscretion, which ever afterwards physically and morally embarrasses him. In the winter of 1817-18, he takes up residence at Hampstead, and after remaining there until March 1818, joins his brothers at Teignmouth, Devon, where Thomas lies fatally

stricken of consumption. In April of this year *Endymion* sees the light, and in the same year *Blackwood* and the *Quarterly* subject him to the penalty of critical fire.

In this same eventful year—1818—Keats finishes a new poem, *Isabella, or the Pot of Basil*; bids farewell to his brother George and brother George's new wife on their departure for America; visits the Lakes in company with a friend, Charles Armitage Brown; makes a tour to Scotland with the same companion, and gets over to Ireland, during which tour he contracts, in the island of Mull, what is to be a fatal cold. He returns to Hampstead in August, visits Teignmouth in September, and again to Hampstead for the winter, first at Well Walk, and afterwards, with Armitage Brown, at a house in Wentworth Place, Hampstead, now called Lawn Bank, where the late eminent physiologist, Professor Sharpey, as many well remember, passed some years of his life in his declining days.

In the winter of this eventful 1818, two other events are memorable in the life of our poet. The first of these events is the commencement of his greatest poem, *Hyperion*; the second, to him, is more eventful still. Hitherto he, with a lively fancy, has laughed at men in love; never could see any so truly simple as men in love—fools all. Now it is his own turn to succumb to the temptation, and become, as he, in other tone, would have said, the greatest simpleton of all.

The lady who conquered the obdurate, dreamy, cynical poet, lived with her mother in a house next door to the house at Wentworth Place, where the poet lived with Armitage Brown. The name of the lady was Fanny Brawne. She and her mother were friends and patients of another friend of mine, and one whom, in his retirement from medical life, the profession generally still remembers with much affection and respect, Mr. C. J. F. Lord.

All the loving romance of Keats' heart fastened on this young lady. His letters to her, ecstatic, tender, biographical, childish, jealous, mournful, form a considerable part of the last of the Forman volumes. His love remains to the last a sad picture. When he is far away in Rome, dying of consumption, three letters of hers, which he has not the strength to read, are put aside by his faithful friend, Severn, to be laid over his heart in his coffin when he is dead, and buried with him.

Fanny Brawne, appearing in the life of Keats, is well carried by her name—respectable, commonplace, hardly beautiful, if the picture we have of her be honest, but prim, lively, and not very sentimental.

A flirt, perchance, as poor Keats felt, from what he observed in her behaviour with his friend Brown, but harmless withal; certainly none of the glorious creature which the poet made her. Their engagement, if so it may be called, came to nought. The poet's death sealed the fate of that, and left the lady to marry a less romantic lover than her first, whose letters, nevertheless, she held unto her life's end.

In the year 1819, after spending some time at Winchester and Bedhampton, and writing the exquisite poem *The Eve of St. Agnes*, Keats comes back to Hampstead with indications of declining health; has persistent sore throat, and, as his letters indicate, is very sad, repentant of some things, irresolute in others, and hopeful in few, if any. In the summer time he visits the Isle of Wight, and later on Chichester. At various intervals his poetic labours progress. He composes the *Ode to a Nightingale*, and *Lamia*; gives up *Hyperion*, on which he was at work, except the published fragment of it, which carries us into the vestibule of its projected glories, and leaves us there, bewildered and half blinded, as gods amongst gods. Then, with Brown, who evidently sways the poet by a strong will, he writes *Otho*, a tragedy, Brown supplying the bricks and mortar, the details of the plot, and Keats doing the architect's work, constructing the whole, and giving whatever grace and beauty belongs to a work so unspontaneously bidden.

On the whole, the year 1819 ends with our poet unhappily. At its close he is once more at Hampstead, with his mind at sea. He will follow literature as a profession; no! he will go back to his apothecary work; no! he will travel. He is already very ill, worse than he himself knows, throat still sore, and mind and body agitated and feeble. In this period, as we find from a letter to his sister, he leaves off animal food, that his "brains may never, henceforth, be in a greater mist than is theirs by nature."

The close of the year 1819 leaves Keats still constitutionally ill; and in the early part of 1820, first days of February, his fatal illness commences. He reads his own doom with the first spitting of blood. "It is arterial blood," is the comment he makes, and from that time he has really no hope, though promises of recovery seem now and then to offer. His poems, *Ode to a Grecian Urn*, *Lamia*, and *Isabella*, are published, but he, now an acknowledged poet, is losing vital power. He moves from Hampstead to Kentish Town, to be near to Leigh Hunt, and for a time lives with the Hunts. Here his illness increases, and, in the opinion of a very able and advanced

physician, Dr. Lamb, one of the first pioneers of the vegetarian movement, he is "under sentence of death."

Returning to Wentworth Place in August, to be nursed by Mrs. Brawne and the beloved Fanny, he remains there a month, and then determines to leave, with his friend Joseph Severn, for Italy, to winter there. He departs in September, and on the voyage writes the sonnet, beginning,

"Bright star, would I were steadfast as thou art,"

his last strain. The two friends settle finally in Rome.

The description of the close of the life of Keats in Rome, written by Severn, is most touching. The simplicity of affection in the writer, who died but the other day, makes it the most beautiful of narratives. Of all the friends who noticed Keats, from genial Hunt to sublime Shelley; of all the hands that helped him, not excluding George Keats, his brother, and the Brawnes, no friend was the like of Severn. It is a real happiness to know that the world does sometimes, by some good fortune, possess such a nature of love and constancy.

In Rome, Keats came under the care of Dr., afterwards the well-known Sir James, Clark, the friend and physician of Queen Victoria. From Clark all that could be effected by the medical skill of that day was rendered, together with much generous kindness from his lady. But medicine and medical art were unavailing, and on February 23rd, 1821, in early morning, the words, "Severn—I—lift me up, I am dying. I shall die easy; don't be frightened; be firm, and thank God it has come," are the closing utterances.

Three days later they bury him near the famous tomb of Cestius; and not long after the ashes of Shelley, to whom he was the Adonais, rest by his side.

Who would follow out further the details of the life of this remarkable youth, may seek them with confidence in the work by Mr. Forman. Let me touch for a moment on one or two characteristics of the poet, and so conclude.

John Keats was like a meteor, which, wandering in the eternal spaces, and coming into contact with, and friction with, the atmosphere of a world, bursts into flame, and dazzling the beholders on a world with its brightness, suddenly dies out. How so fragile a life chanced to be recorded at all as a wonder is, in itself, as great a wonder. The idea suggested by Byron that he was "snuffed out by an article" in *Blackwood* or the *Quarterly*

Review is simply nonsense. His death, expedited, perhaps excited by his own imprudence, was due to a disease which was latent in his nature, hereditarily stamped there. The reviews, bitter, intense, selfish, the work, as all such works are, of unwholesome minds, did, in fact, but serve, by the friction they caused, to bring Keats into permanent notice. But for them, Hunt, Haydon, and Hazlitt would not have been so loud in commendation; Shelley would not have written the immortal *Adonais*, Byron the famous stanzas. But for them, Severn would perhaps not have been so tender, so persistently watchful, so determinately tuned to the idea that, *volens volens*, the memory of his friend should never die. We may throw aside sentiment anent Keats altogether in so far as reviewing goes. There has been on this earth many a Keats, who, failing to undergo such friction, has died unknown.

To be so far honest to the memory of Keats is not to lessen nor to loosen his fame as a poet. A poet true and exquisite he was, "of imagination all compact." "Byron describes from observation, I from imagination," was his own exposition of himself, and it was sound. He was a man who dreamed rather than existed in this world. He lived, as it were, in some vast observatory, looking out on mighty nature. In a room, Mr. Stephens told me, he was always at the window, peering into space, so that the window-seat was spoken of by his comrades as "Keats' place." Here his inspiration seemed to come most freely. Here, one evening in the twilight, the two students sitting together, Stephens at his medical studies, Keats at his dreaming, Keats breaks out to Stephens that he has composed a new line :—

" 'A thing of beauty is a constant joy.'

"What think you of that, Stephens?"

"It has the true ring, but is wanting in some way," replies the latter, as he dips once more into his medical studies.

An interval of silence, and again the poet :—

" 'A thing of beauty is a joy for ever.'

"What think you of that, Stephens?"

"That it will live for ever."

The touch of student life and manner here told, as Mr. Stephens told it me, brings out our poet in his natural form and character. A line, one line!—a thought, one thought in a line, and the fragile becomes the imperishable poet.

In his poetry, it is by catches of immortal thoughts of this kind that Keats still lives. The reviewer was quite right who said it was all but impossible to read through *Endymion*. The opening line above quoted saves it, makes it, and in every poem, except one, some line or expression is the point of inextinguishable fire.

The exception is *Hyperion*, a fragment so called, published by the publisher's will, not the poet's, opening in splendour, and ending abruptly in a dream so marvellous that the reader who truly reads it sinks at finding the dreamer beginning to awake in the dawning of his conception. A chasm infinite :

“ All the sad spaces of oblivion : ”

the gods of the old earth in darkness visible : Saturn prostrate : the mother of the gods, “ in whose face was no joy : ” in the midst of the gloom the sudden light from Hyperion on a granite peak : the voices of the Titans calling to him to let him know Saturn is with them : Saturn ! Saturn ! Saturn ! To read is to see, to hear, the gods themselves ; and though the unfinished, short, concluding part of the poem weakens the effect, there is nothing in Milton more sublime.

From the sublime to the humorous, if not to the ridiculous, is a steep step in the case of Keats, and yet is one that may be taken. In Keats there was a fund of humour, which was broad at times, even to mischief and practical joke. His friend, C. Armitage Brown, let a house of his to a Jewish gentleman named Benjamin. The water which supplied this house was in a tank “ sided with lime.” One day Brown, on going from home for a short time, said to the poet, “ Keats, if any letters come for me, do not forward them, but open them, and give me the marrow of them in a few words.” At the time when Keats, a little later on, wrote to Brown, no letters had come, so he thought he would invent one, and “ dabbed off a short one, which was the reason of the joke, exceeding his expectations.” Taking advantage of the lime and the water cistern, he pretended that Mr. Benjamin had written to Brown the following short note :—

“ SIR,—By drinking your d——d water I have got the gravel. What reparation can you make to me and my family?—NATHAN BENJAMIN.”

“ By a fortunate hit, I hit,” says Keats, who tells the story

himself, "upon his right heathen name—his right prenomen. Brown in consequence wrote to the surprised Benjamin the following :—

"SIR,—I cannot offer you any remuneration until your gravel shall have formed itself into a stone, when I will cut you with pleasure.—C. BROWN."

Mr. Benjamin answered, insisting on an explanation, and then, of course, the explanation in full was discovered, to the amusement of all concerned. Mr. Snook, a mutual friend of Brown and Keats, nearly burst "the hoops of his fat sides."

In another place he has a humorous tilt at the bicycle of his day :—"The nothing of the day—1819—is a machine called a 'Velocipede.' It is a wheel-carriage to ride cock-horse upon, sitting astride and pushing it along with the toes, a rudder wheel in hand. They will go seven miles an hour. A handsome gelding will come to eight guineas ; however, they will soon be cheaper, unless the army takes to them."

From sublime poetry and humour to practical wisdom, which might be called proverbial, is another steep step, and yet is there in the life of Keats. In perusing his many letters, written all in simple love and friendship, with no suspicion that the world would ever see them, we drop constantly on short pithy sayings, which it would be well worth while to string together for ready reference. I will add a few :—

"A man of great executing powers at twenty, with a look and speech almost stupid, is sure to do something."

"Poetry should be great and unobtrusive, a thing which enters into one's soul, and does not startle it or amaze it with itself, but with its subject."

"It is impossible to live in a country which is continually under hatches."

"There is a continual courtesy between the heavens and the earth."

"A mighty Providence subdues the mightiest minds to the service of the time."

"Circumstances are like clouds, continually gathering and bursting."

"Nothing ever becomes real till it is experienced ; even a proverb is no proverb till life has illustrated it."

"Every point of thought is the centre of an intellectual world."

"The genius of poetry must work out its own salvation in a man."

It cannot be matured by law and precept, but by sensation and watchfulness in itself."

"That which is creative must create itself."

I have taken these sentences as they have occurred, without special selection. The letters are full of such short and terse sayings, showing an imagination checked and controlled by a reason which was daily ripening into fruit of choicest wisdom. Even the poetry, in the later stages of it, when the "*slipshod Endymion*" had shown its own faults to the inventor of them, was becoming more and more chastened and reasoning, except when the wild flame of love checkmated the spirit of wisdom.

Of the poetry itself I add no illustrations. The reader who takes up the Forman volumes, in which are included the admirable "remains" which Mr. Monckton Milnes (Lord Houghton) collected with so much judgment, taste, and feeling in 1848, will read all the poems, and love them as they deserve to be loved. He will find the poetry, fanciful as to form, based really on three masters, Spenser, Shakespeare, and Milton;—the descriptive, Spenserian in tone; the wise and dramatic, Shakespearian; the epic, Miltonian. Of his own time and spirit, Keats drew no breath as a poet. In that bad time

"His soul was like a star, and dwelt apart."

The pleasures of men who mistook biting wit for humour, and tinkling sentiment for poetry, were not of his ideal. For the men of real genius of his time, Wordsworth, Shelley, Byron, Haydon, he was not stingy in his admiration; least of all was he jealous of their fame; but he stood apart from them also as masters from whom to copy or to learn.

It has been said that Keats, although educated for our own profession of medicine, had no talent for it. In that vulgar acceptance of the term, which converts talent into success as tested by the money-getting standard, the height and splendour of the idol of the market-place, that may be true. It requires an immense amount of inborn stupidity, and withering of heart, and lowering of soul, and worship of dumb ugliness, to secure success in the money market of a profession, which in its purity is too exalted for wealth either to nourish or debase. But if Keats had once tasted the true spirit of medicine, he would, I believe, have become one of her greatest sons—an addition, perchance, to the some eight or ten of the men of all time whom medicine claims as her own,

her poets of nature, like Keats himself, and in their way poetising in undying thoughts if not in measured lines.

Here and there in Keats' letters, and more than once in his poems, the physician, touched, no doubt, by some metaphysical mysteries, stands forth in strong outline. His aspirations were the truest the truest physician could have. To his friend Taylor he writes: "I find that I can have no enjoyment in this world but continual drinking of knowledge. I find there is no worthy pursuit but the idea of doing some good to the world." To John Hamilton Reynolds he confides: "Were I to study medicine again, I feel it would not make the least difference in my poetry; when the mind is in its infancy a bias is in reality a bias, but when we have acquired more strength a bias becomes no bias. Every department of knowledge we see excellent and calculated toward a great whole. I am so convinced of this that I am glad at not having given away my medical books, which I shall again look over, to keep alive the little I know thitherwards." To Benjamin Bailey he observes, "I am never alone without rejoicing that there is such a thing as death—without placing my ultimate in the glory of dying for a good purpose." Glorious Keats! what a real physician thou mightest have been had the Fates willed it.

There is another letter, addressed to John Taylor, in which a facility for subtle interpretation of mental origins of physical diseases is shadowed forth with singular keenness by our poet. "Our health, temperament, and disposition are taken," he observes, "more from the air we breathe than is generally imagined. See the difference between a peasant and a butcher. Agriculture is the tamer of men; the steam from the earth is like drinking their mother's milk—it enervates their nature. This appears a great cause of the imbecility of the Chinese. What is the cause of so many men maintaining a good state (of health) in cities, but occupation? An idle man, a man who is not sensitively alive to self-interest in a city, cannot continue long in good health. This is easily explained. If you were to walk leisurely through an unwholesome path in the fens with a little horror of them you would be sure to have your ague. But let Macbeth cross the same path, with the dagger in the air leading him on, and he would never have an ague, nor anything like it" Keats not a physician! why, the father of physic himself might have written what the poet has here indited.

Moreover, though it be no credit, he had caught the style of the physic of his time.

“Physician Nature ! let my spirit blood,”

is one of his lines, written, as Mr. Forman, in answer to a criticism on the wording, has shown, in the precise medical tone of a time when “let the patient blood” was as much a technical command in medicine as “right about face” is still a command in military drill.

Again, this poet of ours—for he belonged to us after all, this poetic prodigal, who might have returned to the medical fold—possessed another quality, which, added to his honesty of purpose and excellent learning, must have made him great there : I mean his astounding mental industry. That a youth of twenty-six years, barely, who had lost much time from lingering disease, should have left behind him such volumes of literature, to say nothing of the surpassing quality of it, is sufficient of itself to show what, during a ripe maturity spent in the contemplation of the phenomena of health and disease, he must have accomplished for the good of the human family and for the honour of his vocation. The poetic fervour, the power for subtle appreciation and interpretation of the bonds existing between man and the external eternal spirit by which man is animated—in one word, genius, was in Keats concentrate. In him we held for a moment, and lost, not one “whose name was writ in water,” but the Hyperion of our era.

The First Electrician—William Gilbert, M.D.

IF there be one old town in England more interesting than another to the historical scholar, it is Colchester. Every class of scholar may find some interest there, and we of medicine need not be behind the rest. In Colchester we shall find the birthplace and the final resting-place of the illustrious pioneer in science who gave us the word electricity, and the first true idea of the power. The pioneer in question was William Gilbert, M.D., friend and favourite physician of Queen Elizabeth.

The best account of this man is supplied in *The History and Antiquities of the most Ancient Town and Borough of Colchester*, by Philip Morant, M.A. MDCCXLVIII.

Gilbert wrote his own name Gylberd. He was the son of Hieron (Jerome) Gylberd, gentleman, a native of Hintlesham in Suffolk, but afterwards a burgess of Colchester; made so in 1528. William was born in the year 1540. He studied both in Oxford and Cambridge, and afterwards travelled on the Continent, where (according to Morant) he had conferred upon him the degree of Doctor of Physic. Dr. Munk, however, has gathered from Mr. Cooper, the learned author of the *Athenæ Cantabrigienses*, that he was of St. John's College, Cambridge; that he proceeded B.A. 1560; was elected fellow of St. John's, 21st March, 1560-61; M.A. 1564; M.D. 1569; and senior fellow of his college 21st December, 1569.

Gilbert settled in London when he was thirty-three years of age, and commenced practice as a physician. He became a Fellow of the Royal College of Physicians, passed through the office of Censor and Elect, and in the year 1600 was made President.

That he practised his profession with great success is clear from the evidence of all who have written concerning him. He was received, says Morant, with the highest favour by Queen Elizabeth,

The first Electrician

whom he served as chief physician, and from whom he received a legacy, the only legacy she left to any one. He also, for the short period between the Queen's death and his own, acted as physician-in-chief to James I. By his will he left all his books, globes, and cabinet of minerals, to the College of Physicians.

Morant states that there was a portrait of Gilbert in the Schools Gallery at Oxford in his time, which portrait showed him to have been tall of stature and of cheerful countenance. It is from this portrait that the plate given herewith was probably taken, although we have now no direct evidence of the fact. The plate has been kindly lent to me for autotype copy by permission of the Treasurer of the Royal College of Physicians.

From this plate as the centre of the subject Mr. Arthur Ackland Hunt produced, a few years ago, a very fine historical painting, representing Gilbert making an experimental demonstration in electricity, before Queen Elizabeth. In the picture Sir Walter Raleigh, Drake, and Burleigh contrast admirably with the ladies of the Court, who, if I remember rightly, are more interested in a young courtier than in the experiment.

Gilbert's house in Colchester was anciently called "Tymperley's" or Tympornell's. In Morant's time it "was the same as Serjeant Price, late Recorder, lived in, and still possessed by his widow and relict, Bridget Price."

Where Gilbert resided while in London we have no record; but that he had every facility for his own line of research there cannot be reasonable doubt. To that research, so remarkable for its originality, and so important in its future bearings, I now direct, briefly, the attention of the reader.

The peculiarity of the work which first strikes us lies in a word. Gilbert is the man who gave to us the word *electricitas*. It had been known, long before his time, that the rubbing of amber (*electron*) caused amber to attract some light bodies. Gilbert, whose great line of investigation was on the magnet, differentiated between the attraction exerted by the magnet and that exerted by the excited amber. He connected also the kind of attraction evidenced through amber with that produced by exciting glass, wax, jet, and other substances since known as electrics. His great work *De Magnete*, published in 1600, becomes thus the basis of all our electrical science from that date. Galileo, Bacon, Thomson the historian of the Royal Society, Priestley, and in our later time Hallam, all bear witness to the solid quality and originality of the *De Magnete*.

For preparing this short memoir I have, with the kind assistance of my friend Mr. James Menzies, made a study of this book, some portions of which are sure to be of interest to all scientific and medical readers.

De Magnete opens with a preface to the candid reader and student of magnetic philosophy, a preface so good that it admits, scarcely, of curtailment. In it Gilbert pours forth the spirit of true philosophy. In it he shows that he was well acquainted with and a master of the experimental method of research in natural science. In it he demonstrates that he was actually carrying out, in practice, that which the author of the *Novum Organon*—who, upon natural things, wrote, as Harvey said, “like a Lord Chancellor”—was putting on paper as a series of speculative disquisitions and projects.

Thus in the strictest sense of the term Gilbert might be called the father of modern experimental science.

With Mr. Menzies’ kind and learned aid I give this remarkable preface in full, for the first time, I believe, in English dress.

PREFACE TO THE CANDID READER AND STUDENT OF MAGNETIC PHILOSOPHY.

“Since in the discovery of the secrets, and in the enquiry into the hidden causes of things, stronger proofs can be obtained from reliable experiments and demonstrated arguments than from the probable conjectures and opinions of the ordinary professors of philosophy; since, therefore, the famous substance of that great magnet, our common mother the earth, hitherto wholly unknown, and the conspicuous and eminent forces of this globe of ours, may be the better understood, I propose to begin from the common magnetic, earthy, and iron bodies, those substances of our globe which we can grasp with our hands and perceive with our senses, and then proceed to demonstrable magnetic experiments, and so penetrate, for the first time, into the innermost parts and secrets of the earth. For after very many of those things which have been obtained from the heights of mountains, the depths of seas, the profoundest caverns and buried mines have been seen and understood, then at last we shall have learnt the true substance of the earth. To the investigation of magnetic force (such, indeed, are the wonderful and surpassing qualities of the bodies known to us) have I given a great and prolonged attention. Nor have I found this labour idle and unfruitful, inasmuch as during the progress

of my daily experiments, new and unexpected properties have revealed themselves, and my love of knowledge hath so much increased from the diligent survey of things, that I have essayed to show forth the very interior of the terrene globe and its true substance on magnetic principles; to reveal unto men the Earth (our common mother), and to point it out as with the finger, by true demonstrations, and by experiments manifest to the senses.

“And as geometry ascends from sundry very simple and easy principles to very high and difficult conceptions, by which the wit of man climbs above the firmament, so our teaching of magnetic science first sets forth in convenient order certain obvious facts; out of these more remarkable ones come to light; and at last, in sure order, the concealed and greatest secrets of our globe are opened, and the causes of those things known which, either through the ignorance of ancient, or the neglect of recent times, have been overlooked and unknown. But why should I, in so vast an ocean of books, by which the minds of ingenious men are troubled and fatigued, through which very silly productions the herd of unreasoning men are intoxicated, rave, are puffed up, and create literary broils, and while declaring themselves to be philosophers, physicians, mathematicians, and astrologers, neglect and despise men of learning: why should I, I say, add anything new to this republic of letters, and expose this philosophy, glorious, seemingly new and incredible, on account of so many things hitherto unrevealed, to be condemned and torn to pieces by the ill words of such persons as are pledged to the opinions of other men, or are the foolish corrupters of good arts, bookish laymen, grammarians, sophists, wranglers, and froward individuals of the meanest kind? But unto you almost alone, you honest students of philosophy, who seek knowledge not from books only, but from things themselves, I commend these principles of magnetism, set forth in a new mode of philosophising.

“And should it not seem fit to some to assent to sundry opinions and incredible statements, they may nevertheless contemplate a great array of experiments and discoveries (such as all philosophy ever flourisheth in), which have been searched out and demonstrated by me with much care, watchfulness, and cost. In them rejoice, and to good purpose enjoy them, if ye be able. I know how difficult it is to give freshness to old things, brilliancy to the antiquated, light to the dark, grace to the despised, credibility to the doubtful; how much more difficult is it to obtain and establish some authority for things new and unheard of, and which are opposed to all the



Hursting del.

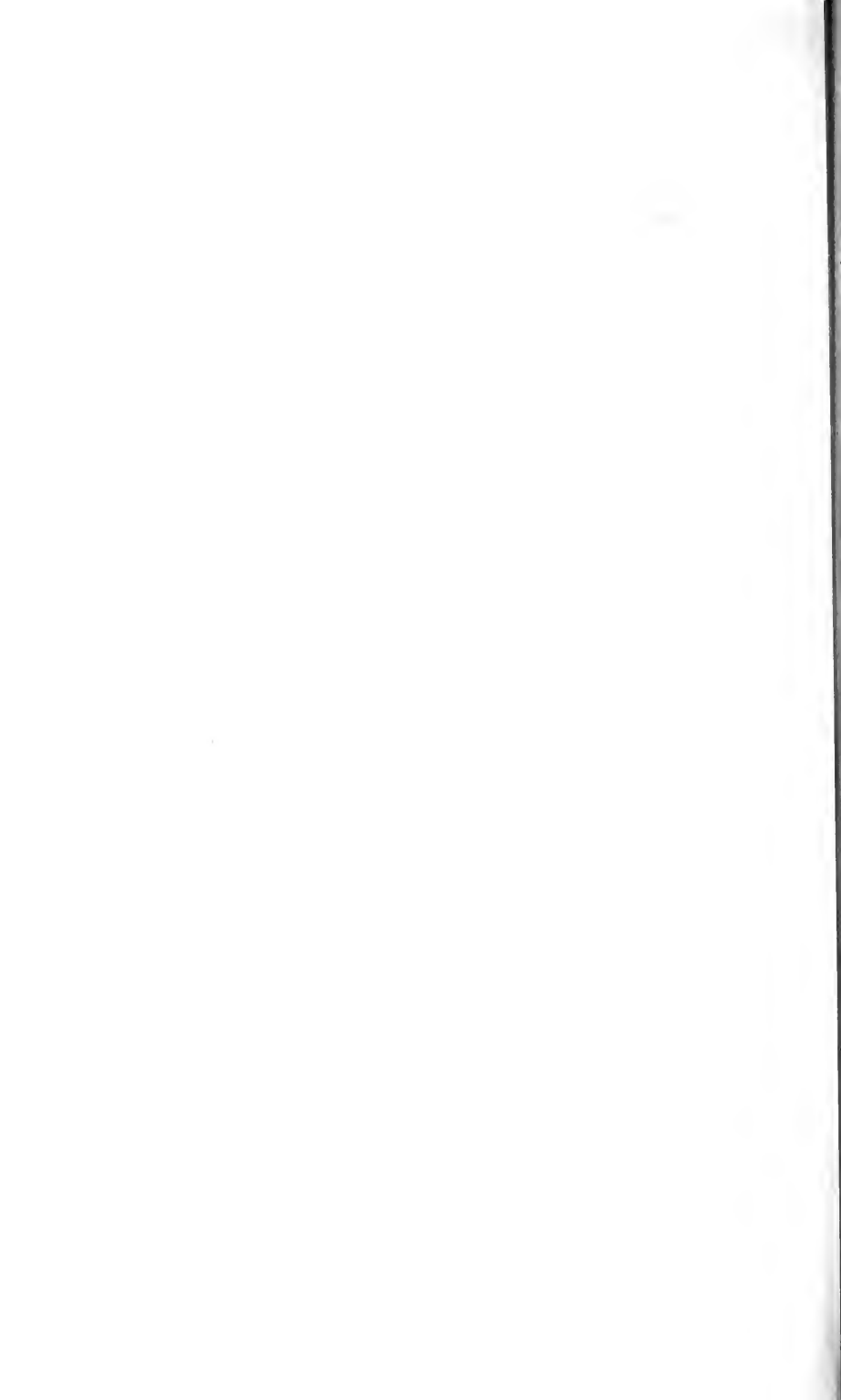
Cham. sc.

DR. WILLIAM CHAMBERLAINE,

Physician to Q^{ueen} Elizabeth.

From an Original Picture in the Bodleian Library Oxford.

Publ. Nov. 1796 by S. P. H. Jun. Vol. M. B.



beliefs of men. Nor for that, however, do I care; since I think it is to few that the philosophic spirit hath been vouchsafed. Whoever desires to make trial of the same experiments, let him handle the substances not unskillfully and carelessly, but wisely, aptly, and in a business-like way; and let him not (when he fails of success) begin to find fault with my inventions, for nothing hath been set forth in this book which hath not been examined and many times tried and repeated by me. Many things in the reasonings and hypotheses will, perchance, at first sight seem very hard to be received, yet I doubt not but that at length they will obtain authority from the clear proofs given. Wherefore, in magnetic science, they who advance furthest, trust most in, and receive most profit from, the arguments adduced; nor in this science will anything easily become clear to any one in which all or nearly all points are not known. Almost the whole of this department of natural science is new and unheard of, except what a few writers have delivered concerning certain familiar properties of the magnet. Wherefore, I but little approve of the aid obtained from the ancient Greek writers, because neither the poor Greek arguments nor the Greek words avail to demonstrate or cast any light upon the truth. For our magnetic teaching is at variance with most of their principles and received opinions. Neither have I brought to this work any craft of eloquence or adornment of words, but this only have I done that things difficult and unknown may be so handled by me and set forth in that style of writing and in those words absolutely necessary, that they may be clearly understood. I sometimes, therefore, use certain new and unusual words, not that by means of the childish veil of words, shades and darkness should be cast upon facts (as the alchemists are wont to do), but that hidden things, which have no name, and which have never before been understood, may be plainly and clearly delivered by me.

“After describing our magnetic experiments, and making known the like elements of the earth, I proceed to the general nature of the whole globe itself, wherein it is allowed us to philosophise freely and with the same liberty which the Egyptians, Greeks, and Romans formerly used in publishing their opinions: whereof very many errors have been handed down to later authors, and in which smatterers still persist, and so wander, as it were, in perpetual darkness. To each of these ancient and earliest fathers of philosophy, Aristotle, Theophrastus, Ptolemaeus, Hippocrates, and Galen, let due honour be paid: such are the writers who have diffused knowledge to

subsequent ages ; but our time hath disclosed and brought to light very many facts which they also, had they been alive, would doubtless have accepted. Wherefore we hesitate not to deliver, in an argument founded on truth, those things which have been discovered by us after prolonged experiment."

THE BOOK.

Such is the preface to this wonderful book. Its first chapter supplies a description of the magnet and of magnetic virtues. In its second chapter it introduces us to the word and the power, electricity. It explains that not only will the magnet attract some bodies brought near to it, but some other things will do the same, after they have been excited by friction. Amber, *electron*, is one of the substances which can be thus excited ; jet is another of the same kind ; but amber came first into knowledge as evincing this remarkable property.

"Amber," Gilbert says, "holds flies, ants, and other small creatures shining in eternal sepulchres"—*aeternis sepulchris relucentes*. There was a touch of poetry in William Gilbert.

The bodies of this nature may, then, be called electrics, and the property they present may be called the electric, or electrical. There are many bodies which act as electrics, besides amber and jet. The diamond, the sapphire, and some other precious stones, glass, sulphur, mastic, sealing-wax and resin, are electrics.

Gilbert seems to have discovered that glass, sulphur, and wax are electrics, his mode of discovery being as simple as it was effective. Small strips of metal suspended from their centres were the best objects. To them the excited electric was presented, and the attraction was the proof of the electrical action.

He was very exact in noting the conditions under which electrical action could be best observed. He found that it is always most active when the air is dry and when the wind is north or north-easterly. Moisture destroys the effect, and even the presence of the breath is sufficient to impair it. He made an attempt to electrify water, and by presenting an electrified body to drops of water, produced a conical shape in the round drop. He discovered that if an electrified rod were brought near to the dense smoke rising from a burning substance, the smoke was attracted. He suggested that electrical attraction was due to the electrical fluid or effluvium rushing from one substance to another of similar kind, and cohering,

as two drops of water cohere and run into one. He suggested also, on this matter, a distinction between magnetism and electricity.

"The difference between magnetic and electric force is, that all magnetic bodies attract by their mutual strength, while in electric bodies the electric attracts only; the body attracted is not changed by its natural force, but is drawn spontaneously by the nature of the material of which it is composed. Bodies are drawn towards electric bodies in a straight line towards the centre of electricity; but the magnet attracts the magnet only at the poles directly, at other points obliquely and transversely, even as they adhere and hang together. Electric motion is the motion of an accumulation of matter; magne-

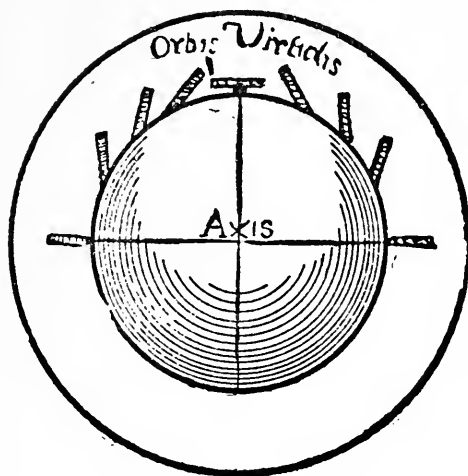


Fig. 1.

tism, of arrangement and order. The globe of the earth is collected, and coheres by electricity. The globe of the earth is directed and moves by magnetism, and at the same time it also coheres and is welded together in its inmost parts, so that it becomes solid."

To these remarkable indications must be added, however, others as remarkable in respect to the magnet. There is something startling in certain of the chapters relating to the electrical properties of the earth and the attraction of the planet for substances upon its surface. He gives a drawing (fig. 1), of which I present a copy, in which he depicts a magnetic globe or orb, and indicates how magnetic poles or bars arrange themselves in respect to the axis of the globe.

One of the most interesting chapters on this matter of terrestrial magnetism is chapter xvii. in Book I., *Quod globus terræ sit magneticus*. "The globe of the earth magnetic; the magnet; and how the magnetic stone has all the primary forces of the earth; and that the earth through the same forces maintains its fixed position in the universe."

This chapter begins :—

"Before the cause of magnetic motions, the demonstration of facts concealed during so many ages, and experiments (those true foundations of human philosophy) are brought to light by us, that new and unheard-of opinion of ours must be stated and laid before the eyes of the learned; which, when it has been debated and supported by certain probable reasons, it will indeed be established as firmly as anything which hath ever been seen or proved in philosophy by ingenious arguments or mathematical demonstrations."

Gilbert's opinion, thus prefaced, is, that the earth with its masses of rock and water, and all its parts, whether seen or hidden from human sight, is a magnet, and is possessed of all the qualities known as magnetic. "I consider," says he, "the earth to be a solid substance, firmly cohering in its primary form, and (as in the other globes of the universe) endowed with a well-knit form, which maintains its position and fixed polarity, and revolves with a determinate motion from an implanted power of movement, even as the magnet, beyond all bodies seen by us, possesses a true and genuine character, little injured and deformed by external evils, which is a homogeneous and true part of, and which has been separated from, the body and volume of the earth.

"Such is our earth in its interior parts, a body possessing a homogeneous magnetic nature; and on such a perfect foundation stands the whole nature of terrestrial things, which under our diligent scrutiny everywhere shows itself, such as in all the magnetic metals of the earth, in veins of iron, in all kinds of clay, and in most varieties of earth and stone: whereas the pure element of Aristotle, and the vain terrestrial phantasm of the peripatetic philosophers (that simple substratum of all things) is rude, inert, cold, dry, dead, of no vigour, hath never appeared to any one except in dreams, and is of no effect in the nature of things. To speak plainly, all the solid earth, wherever it is seen; even that earthy matter which has not been purified from coarse and humid elements, such as clay, mire, and material gathered from putrid substances; whether they have been injured by the imperfection of various mixtures, or fallen

to pieces through their grossness like marl ; all these, whether they have been prepared by fire alone, or are freed from their superfluous moisture, are attracted by the magnet, and as by the magnet so also are other bodies magnetically attracted and set in order by the earth itself ; and through their implanted force do they arrange themselves according to the method and order of the world. So also every fragment of the earth, by true experiment, shows all the force of the

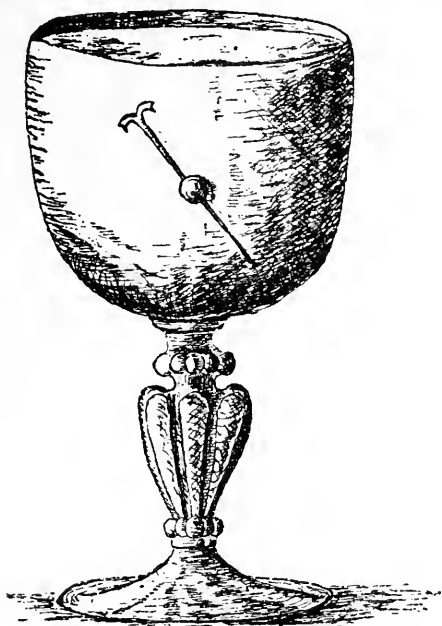


Fig. 2.

magnetic nature, and obeys the globe and universal principle of our earth throughout its various motions."

In another part of his work he gives the following diagram to show how a needle, floated by means of a cork in a goblet of water, exhibits both variation and declination if it be rendered magnetic (fig. 2).

In chapter xii., Book I., he compares magnetic force to vital force. Magnetic force is life, or resembles life, and surpasses human life in many respects, while it is bound in the organic body.

The First Electrician

"The magnet is wonderful in innumerable experiments, and is, as it were, a living force. This is the one remarkable virtue of those which the ancients considered to be life in the heavens, in globes and stars, in the sun and moon. For they considered that such varied motions could not be maintained without a divine and living force; or that without it, vast bodies could revolve in fixed terms, or that wonderful powers could be infused into other bodies through this primary form of the globes themselves. The ancients, the whole Platonic school, the Egyptians and Chaldæans, affirm that the universe is endowed with life. On the other hand Aristotle thinks that the elements are inanimate, the stars animate. I myself think that the whole creation, all globes, all stars, and the glorious earth itself, are governed from the beginning by a proper and determinate life, and have their movements of self-preservation. Although there are not in the stars, the sun, or the planets any organs which can be recognised by us, yet they live. If there be anything of which man can boast, assuredly it is life; and God Himself (by whose will all things are ruled) is intelligence, is mind. Who is he, then, that will demand organs in the divine mind, which overpasses all the framework of organs, and is not restrained by material organs? But in the different bodies of the stars, the implanted force acts otherwise than in those divine things which are supernaturally ordained; and in the stars the force acts otherwise than in animals; in animals otherwise than in plants. Certes, it were a miserable condition of the stars, a base lot of the earth, if that glorious dignity of life were denied them, which hath been granted to the worm, the ant, the moth, the plant and the toadstool."

LAST DAYS AND WORKS.

Morant is careful to tell us that Gilbert left behind him another work, *De Mundo Sublunari Philosophia Nova*, which work, still in manuscript, was retained in the library of Sir William Boswell, Knight. Nearly fifty years after the death of its author it was published from Amsterdam, by his brother William Gilbert, junior, a proctor in the Court of Arches, with a dedication to the unhappy Prince Henry of Wales, friend of Walter Raleigh, and son of James the First.

According to the same biographer, Gilbert invented two ingenious instruments for seamen to find out the latitude without the

help of sun, moon, or stars. The instruments were made public by Thomas Blondville, in a quarto work published in London in 1602.

The annual pension left by Queen Elizabeth to our philosopher physician was not long enjoyed by him. The queen died on



WILLIAM GILBERT'S RESIDENCE AT COLCHESTER.

March 24th, the philosopher on November 30th, 1603. He was never married.

In many respects Gilbert resembled Harvey, particularly in having been much beloved and honoured by his brothers, of whom he had four—Ambrose, William, Jerome, and George. Over his tomb in the Church of the Holy Trinity, Colchester, the brothers

The First Electrician

Ambrose and William placed a Latin inscription, which my learned brother Munk has copied into his Roll of the Royal College of Physicians, and which I supplement in English:—

AMBROSE AND WILLIAM GILBERD HAVE PLACED THIS TOMB,
 IN MEMORY OF BROTHERLY PIETY
 TO WILLIAM GILBERD, SENIOR, GENTLEMAN, AND DOCTOR OF MEDICINE,
 THIS THE ELDEST SON OF JEROME GILBERD, GENTLEMAN,
 WAS BORN IN THE TOWN OF COLCHESTER,
 STUDIED THE ART OF MEDICINE AT CAMBRIDGE,
 PRACTISED THE SAME FOR MORE THAN THIRTY YEARS AT LONDON,
 WITH SINGULAR CREDIT AND SUCCESS,
 HENCE, CALLED TO COURT, HE WAS RECEIVED WITH HIGHEST
 FAVOUR BY QUEEN ELIZABETH,
 TO WHOM, AND TO HER SUCCESSOR JAMES, HE SERVED AS CHIEF PHYSICIAN.
 HE COMPOSED A BOOK CELEBRATED AMONGST FOREIGNERS
 CONCERNING THE MAGNET, FOR NAUTICAL SCIENCE.
 HE DIED IN THE YEAR OF HUMAN REDEMPTION, 1603, THE
 LAST DAY OF NOVEMBER,
 IN THE 63RD YEAR OF HIS AGE.

The monument bearing the above epitaph remains in fair preservation in the old church of the Holy Trinity; and hard by still stands Gilbert's house, once the Tymperley's. Friend Henry Laver, of Colchester, Surgeon there, and excellent antiquarian scholar, to whom I am much indebted, has taken a photographic view of the residence as it now is, which view Bertram Richardson has transferred to paper, as a fitting conclusion to this short history of the First Electrician.

A Great Medical Reformer, Thomas Wakley, M.P.

A Personal Recollection and Tribute.

IN previous biographies I have written brief notices of some of those illustrious whose lives are precious for study. To-day I sit down to write, while still the memory is fresh upon me, some recollections of a man who, when I was in the vestibule of the Æsculapian Temple, was one of the most striking figures within it, and who, when I entered the temple, was amongst the first to give me welcome, to strengthen me in intention and inspire me with hope.

This man was not, like my Gilbert and Harvey, a discoverer in natural science ; he was not, like my Keats, a poet. He had few of the qualities of any of those of "our great ones of the past," whose lives I wrote long ago. But in his way he was very great, very powerful, very much feared, and, withal, and as a consequence, very severely attacked by many, but by none more than by those who felt surest that he would never divine, by their manner and bearing towards him, from whom the offence came.

To my young mind it was a new experience to see the behaviour with which this man was treated : such merciless aspersion, such truckling servility, such cowardice, and often, too, from quarters where it was least expected. I remember talking to my good old friend, Dr. Robert Willis, on this subject, and saying that I had half a mind to leave a profession in which I was morally disheartened, and try my luck at the bar. "You will fare no better there," he replied, "if you try it, and you had better go on. As to the man you name, in whatever profession he had entered, he would have shared the same fortune and misfortune. In the Church he would have been a Pope

or a martyr; in the Law a Lord Chancellor, or a reformer out of the recognised pale; in the Army a General or a rebel; in the Navy an Admiral or a corsair. In Medicine he has had no scope for such extremes, but he is what he is there, a character quite unique, utterly fearless, resentful of all narrow abuses, and, according to his lights, honest as he is fearless and determined; a man who would crush an enemy as he would a wasp, and treat a flatterer, whom he knew for such, as a born enemy; but who loves his friends and helps some, whom he thinks well of, much beyond their merits."

This was Willis' summary of his cotemporary, and Willis had every chance of being near the truth. He had himself just resigned the editorial chair of the *Medical Gazette*, and the cotemporary of whom he spoke, and whom I have on the easel now, was Thomas Wakley, M.P., Coroner for Middlesex, and the founder and editor of the rival medical journal, *The Lancet*.

It seems to me but yesterday since I first saw this famous editor of *The Lancet*. He was in the zenith of his power. He had overcome most of his enemies, and he was beginning, at last, not only to be admired for his abilities, and feared for his power, but liked for his nature, abounding, as it did, in qualities which attached, with a close attachment, all who were intimate with him. This phase of feeling towards him did not develop, however, from within the professional pale. It began from the outside, from the people; from the people when they discovered in the honourable member for Finsbury, and in the energetic and powerful coroner for Middlesex, as well as in the editor of *The Lancet*, a friend who stood up against every oppression, and who, at all risks, defended the oppressed against the most potent oppressors.

A soldier had been whipped to death in Middlesex. In these days it is somewhat awful to think that such a thing could have been—that a man, for any offence, could be led out into open day and deliberately "cut into shreds," until he died slowly and horribly. Yet, in the name of military law, this thing had been done; and, as a coroner holds still an inquest on a man who has been executed by the hangman, Mr. Wakley had to hold an inquest on this soldier executed by the lash. There was probably not one other coroner in England who would not have held that inquest from mere formal necessity, have instructed the jury that the death was an unfortunate natural accident of the punishment, and so have dismissed the case. The coroner for Middlesex viewed the matter with different eyes. To his clear mind the accident was murder. He made no

secret of his views ; he showed no hesitation as to his duty. The leaders of the army were against him on the plea of discipline ; the legal authorities, some of the highest, on the plea of law ; the "rag" of every club was against him on the score of danger to aristocratic stability ; the Government was against him on the score of difficulties which it would encounter in introducing a change of punishment in the service ; the press was for and against him, but more against than for him, because the subject of change of law had not then been raised to such a pitch as to be a burning question, ripe for solution.

In spite of all, the coroner stood firm. There was no point of law on which he had not prepared himself ; there was no medical, no surgical fact on which he did not obtain competent and weighty evidence. The result was that the exposures he made, and the verdict he obtained, rendered whipping to death ever after impossible in the army of Great Britain.

The reaction in favour of the coroner has to be remembered in order to be understood. In the House of Commons he had been winning his way. His bold, rough Saxon eloquence, which first became welcome to Finsbury, had been recognised in Parliament. This audacious justice in the Middlesex coroner's court completed the triumph. It excited the popular heart wherever that heart beat, and the name of Mr. Wakley became a household word.

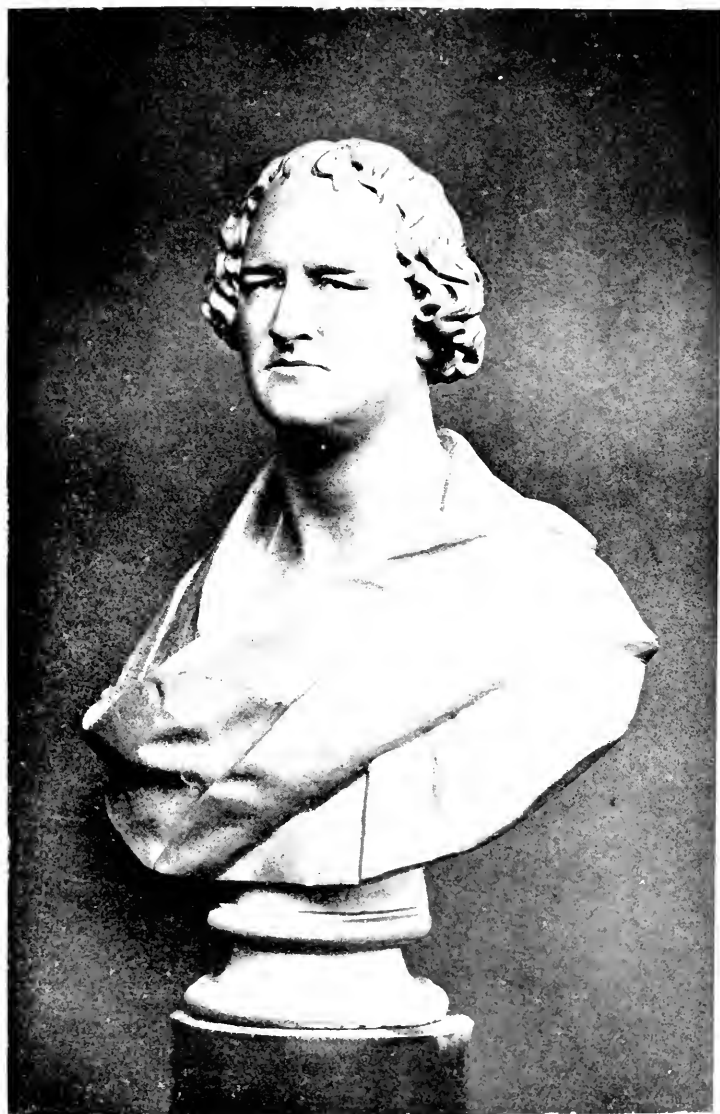
It was then that even opponents in the profession of medicine began to see that they had amongst them a man. Whether they loved him more, or feared him less, he did not know, and probably did not care. At all events, they were forced to respect him, and that was his ambition.

It was in *The Lancet* office where it still stands, in the Strand—in 1851 probably—that I first saw the founder of *The Lancet*. A small room on the second floor was his favourite study. Permission recently granted me to look at the room showed it much as it was then. The old editorial desk was still there. The chair by the window, from which the editor, in moments of relaxation, would play with masterly skill his favourite game at chess, dictating the moves without looking at the board, and winning many games, while he was at the same time sketching out a leader, or putting together the details of an inquest still adjourned, was still there. The couch on which, as he more than once told me, he could lie down and fall asleep in five minutes at any time, was there. Everything seemed to be so precisely as he left it, I experienced a kind

of sudden disappointment that he was absent. It vividly brought back our first interview.

A very early paper of mine, read before the Medical Society of London, on the *Antiseptic Properties of Gases*, had brought the first meeting about. In that paper I had described the details and the results of a research then, I believe, quite new, to ascertain if dead animal structures, pathological and other, could be preserved from decomposition in different gases and vapours. I had found that all the anæsthetic vapours, as far as we knew them, possessed some antiseptic power, and that chloroform vapour was a splendid antiseptic. I had found that ammonia possessed the same quality in a marked degree, but that the gases of which it is composed were less marked in this respect when they were used in their separate form. I had ascertained that when arsenic was combined with hydrogen, as arseniuretted hydrogen, a gaseous product was at hand which prevented ordinary decomposition absolutely, but which led to a transformation of muscular fibre, resembling, in the closest degree, fatty degeneration of the same kind as was then being much studied in morbid specimens of fatty degeneration of the heart. These, with many other facts, had made up my paper, and it, together with the structures by which it was illustrated, two or three of which still exist, attracted the favourable comment of one of the members of the staff of *The Lancet*, Mr. J. Fernandez Clarke. That *The Lancet* should speak well of so young an effort was interpreted by Dr. Snow and other friends as a very good sign, and soon afterwards I had an intimation that Mr. Wakley wished to see me. In this manner I made his acquaintance and his friendship.

The plate published herewith is taken from a bust of Mr. Wakley, and is an admirable likeness of him at the period of which I speak, in so far as the face is concerned. But the whole man had to be seen before any judgment could be made of bearing and style. Then the power of the man was apparent ere ever a word was spoken. There was a massiveness which meant strength, and a physical proportion with a balance of power which impressed every one, and which suited the office of coroner so well as to be the subject of general comment. I heard it once said of him, in his court, that he was every bit a judge without the wig and gown; and no statement was ever more truthful. When standing he was sufficiently tall to be commanding—five feet ten to eleven, I should say, was his height—and of good comely stature. When sitting he



THOMAS WAKLEY, M.P.



looked taller than most men, and at the dinner-table sat somewhat above the majority. He was altogether of large build, with a chest of forty-five inches girth at least, a body well shaped, limbs strong, hands rather large, and grip of them unmistakable when he shook hands, which he was rather chary of doing unless he took a sudden liking, or by acquaintance some time continued, learned to like a stranger. His face was large, and intelligently and flexibly, though firmly moulded; features well developed; forehead high rather than broad: eyes small, grey, piercing, and seeming to lie far back, from a habit he had of making his eyebrows tent over when he was earnestly looking at any person or object. Complexion fair, with slight russet ruddiness, and in the flaxen curling hair just a tinge of the same sort. The mouth well set, the lips easily and quickly compressed during emotion, so that, though of moderate size naturally, they then looked thin. Ears well shaped, and lobes large, "showing," as Laycock said, "the truth, sir, of my theory—large ear lobe, active brain." The voice round and commanding but sometimes rather spoiled by a sudden sharpness or thrill almost tremulous, and at first peculiar to a stranger listening to it. Mode of speech slow, collected, firm; no possible mistake whatever about what was meant, whether for exposition, for praise, or for blame. No Lord Chief Justice could sum up more clearly or incisively than this coroner for Middlesex.

I give here as they come back to me the general impressions which I took of Mr. Wakley at my first introduction and afterwards. There were, however, other characteristics, which I, and all who understood him, soon discovered. Behind what seemed a rugged and determined front, there was a gentleness of disposition which passed even to tenderness, and surprised those who merely knew the man by what was said of him. If in him fire of passion ever glowed, he concealed the fire better than any one I ever have known. The members of his staff might be disturbed and irritable, he never. "What do you do when you are angry, Mr. Wakley?" I one day asked him. He looked at me with a twinkle of his deep-set eyes, and, with an expression that carried a suppressed laugh, answered, "I sleep it off, my young friend, as you must learn to do." In parenthesis, I may say that I took the lesson to heart until I became master of it, and a very useful lesson it has been to me.

John Fernandez Clarke told me that he had never seen his "chief" angry in the true sense of the word, and that when he, the "chief," saw those about him inclined to anger, he "smoothed

them down in no time." But he was not, because of that, the man to put up with bad temper or wilful annoyance. On the contrary, he had the most masterful control over what was objectionable, using, when it suited him, a rich humour of criticism which answered admirably. I recollect one good instance in point.

A rather clever man, who had gone through a university education, had been afterwards to Germany to study organic chemistry under one of the great masters there, and who had come to London to start as physician, *summum bonum*, tendered to *The Lancet* a course of papers of an advanced type. The offer was accepted, perhaps, for editorial after-peace, a little too readily. The young author had two possessions: a superb idea of his own greatness, and a name amongst the most commonplace of English surnames. From both these causes he was in danger of being any day completely swamped in Babylonish banter. He was saved swamping from the first cause with great difficulty, because he had no originality of conception to sustain the learning which floated him. He was saved swamping from the second cause more surely, because his parents, with fine forethought, had, in baptism, added a prefix to his surname which distinguished it admirably from the vast multitudes of the same patronymic. So he managed to float pretty safely, and even to cut a fair figure in a smooth sea. There was such a sea on when his papers appeared in *The Lancet*, and he floated so gaily that he thought he had become the mainstay of the ship that carried him. Thereupon my gentleman grew bounceable, and worried the sub-editor so terribly that he, poor man, went nearly wild. He could not get copy without infinite trouble; he got copy, had it set up, and received it back so "dirty," it was thought better to have it all set up anew than to revise proof. Then, if in the final printing there should be a technical error, the row was fearful. This petty tyranny reached at last such a pitch, that the "sub." went to the "chief" to explain his grievances. The "chief" counselled a try at further forbearance, since the papers answered, and the trial would soon be over. The experiment of further forbearance was made, and failed. Matters got worse, and, finally, so much worse that it became difficult to get the journal out at the usual time of publication. To his "chief," therefore, the sub-editor once more resorted. "What am I to do, sir?—I can forbear no longer." "Present my compliments to Dr. —, and tell him that from henceforth you have my instructions to announce his papers as usual, but that we intend to drop his —" (the baptismal part of his name). The remedy was

droll as it was drastic, but it answered perfectly. The sub-editor had no more trouble.

The humorous side of Mr. Wakley's character occasionally came out in another form, in the way of shrewd remark on some word or topic. One day the card of a visitor was brought to him, bearing a name he did not know how to pronounce. The name became familiar in time, but at that period was not so. When the visitor had chatted awhile, Mr. Wakley, getting interested in him, asked him upon leaving, how precisely to pronounce so singular a name, and having got the information, added a word of advice. "You promise well, sir, very well. You have ability, and, I believe, perseverance; but you must be very, very cautious because of your name. Yours is a name that will require the most delicate manipulation."

These playful sallies were frequent, and relieved his utterances from dead Saxon weight and oppressiveness. Saxon, mainly, by race, Saxon by name, probably from one of the towns, Wakerly, after Saxon fashion of naming, there was just a touch, both in physique and mind, of Keltic stock too, which gave point to weight and brightness to solidity. Sir John Forbes, who did not like him over-much, said he was a Nasmyth's hammer: he could smooth a curl or crack a pate with equal facility.

The perfect control over passion which Mr. Wakley possessed, combined with the force of character and intense vitality with which he was endowed, was the secret of his remarkable success under circumstances that would have killed men equally powerful but less restrained. Through affection the will of a child might influence him, but he bowed his will to no domination, and knew no master. He came from Membury, in Devonshire, to carve his way in London, as a surgeon, with as little help as any man ever had. He might, with his pre-eminent ability, have gained any place in the old grooves, if he would have bent to the official yoke. He would not bend an inch. He was thus, from the first, considered fractious and over-independent, subjecting himself, thereby, to the strangest accusations, and exposing himself to legal and even personal risks which in these days are unknown. His self-control was his safeguard in all these trials of his courage and endurance; or I had better said his self-control and self-reliance, for in all his legal contests, amounting to about a score, he, from first to last, acted as his own advocate, and except on two occasions, or three at most, came off victor. It is but just to him to add that when a struggle was over

he was always as ready to forget the past as he was to buckle on his armour again for another affray. His enemies said that he enjoyed combat. I think that is doubtful. But he was a born reformer of great abuses, and he knew that it was his fate to be belaboured freely and belied roundly, as all such men are, by the respectabilities as well as the rowdies of society.

Why he should at first have taken up the subject of reforms in the profession of medicine he never knew himself, except that the work had to be done and somebody was bound to do it. These were his own explanations in almost the words I have written, as I remember to have heard them. He saw the most flagrant abuses and monopolies all through his student's career : abuses in hospitals, in colleges, everywhere. To remove these, heroic or heroic treatment must be adopted. The heroic or heroic treatment for physical disease was then practised by the use of the tiny instrument of steel which, according to Byron, killed more than the lance, and which, by the way, gave the *coup de grâce* to Byron himself. The body medical, by analogy, required the same treatment. Hence the origin of *The Lancet*.

The Lancet, the present leading medical journal of the world, for all public views of it, was the inspiration almost of a minute. The intention of the journal and the name of it came, its founder told me, into his mind at the same moment ; and the first number, which came out on October 5th, 1823, was so little premeditated that it appeared before the material for the second number had been thought about, except for a lecture by the great Sir Astley Cooper. That first number is of thirty-six pages, double column, and octavo size. A seedling indeed. The first volume for three months contains less matter than two weekly numbers contain now. To show the entire independency of thought with which it was launched, the first number of *The Lancet* was published on Sunday, and continued to be so published for a long time afterwards.

It was a little *Lancet* as it began, but any one who will read it, even now, will be interested in it. It was audacious beyond measure. It presumed to connect the art and mystery of medicine with the great world of which that art and mystery was a concealed part. It said to the public, Read physic. It said to the profession, You and the public are one and the same. It bade the professors of physic study in its own pages, not medical subjects only, but everything else that was of public interest. Chess, the stage, the concerts, odds and ends of stray stories and anecdotes, some

exceedingly good, these filled the first *Lancets*, one of Sir Astley Cooper's lectures, models still of professional art as well as of science, having the place of honour.

The rectification of abuses, the reformation of medicine, through good report and through bad, was the one grand aim of *The Lancet*, everything in it a means to that end. That it would ever become the widely spread, the widely read, the influential, and, I ought to add, the profitable journal it has become, never entered into the early hopes of its founder. The last thing he dreamed of was that his keen *Lancet* would become a rich fortune for his children. He used it with a strong hand to correct what he considered abuses; and his exemplary wife—for he married early in life—not wishing him to pursue the regular professional prescribing course of medicine, he left that line of practice entirely, to make journalistic literature and public work his sole occupation.

As a matter of course, troubles sufficient soon came upon the enterprising, merciless, uncompromising editor. Scope for any amount of criticism lay before him, and he availed himself of the opportunity to his fill of it. In the first years of his work the sick hospitals of the metropolis were the closest boroughs in the country. Men got appointments in them who had neither the eyes to see, the ears to hear, nor the tongues to teach. One man alone in one of these "mummeries" might rule the whole. Mr. Wakley went tilt at this scandal. The officials might deliver lectures within those sacred walls, and students might listen after they had paid for the privilege, but nobody might poach there. The game laws of physic were exacting, and firmly kept. The editor of *The Lancet* did not fear. For good or for bad those lectures shall come before the public eye. If they be good, if they tend to the mitigation of one pang of human suffering, the whole profession, and through the profession the whole public, shall have the benefit of them. If they be bad, nay very bad, the whole profession, and through the voice of the profession the whole public, shall have the condemnation of them. The contest for freedom against monopoly soon began. In the third year of *The Lancet*, Mr. Abernethy, an able, unflinching Scotch surgeon, whose name has become a sort of password for a peculiar kind of wit of the quiddit type, and of whom I shall, if I live, have something to write at a future day—Mr. Abernethy applied for an injunction that his lectures should not be published. The fight was a tough one, and a whole number of *The Lancet* seems to have been devoted exclusively to the details

of that action. In various minor ways the same opposition was renewed, and renewed again. In the end the press was victor, and although loaded with all sorts of calumnies, the founder of the free press of medicine stood master of the situation. The dissolution of the Abernethian injunction, realized in the early part of 1826, set the medical press at liberty.

An action of a more personal character, an action for libel taken out by Mr. Wakley against Dr. James Johnson, a rival editor of a distinguished and classical journal devoted to medicine, with two other similar actions against men less known in professional circles, three trials in one year, seemed only to whet the courage of our indomitable editor. For, so soon, or hardly as soon, as these were settled, he opened fire on the great medical and surgical corporations. The Royal College of Surgeons, snug, rich, and lofty, came first under his lash, the effort leading, indirectly, to two more actions for libel, but ending on the whole triumphantly for him.

A firm footing gained in the matter of reform in the colleges and in the universities of Scotland, as a result of the castigations applied to both, a general outline of reform for medicine altogether was his next idea, an idea which up to this day has never been completed. What the basis of that great scheme of reform was, which Mr. Wakley first suggested, and which he continued to defend till the close of his life, is worth a moment's attention.

By various legal provisions the government of the medical profession in these Islands had become deputed to a few central colleges or corporations, such as the Royal Colleges of Physicians and Surgeons, and the Apothecaries' Companies. These, like so many medical Vaticans, dispensed their privileges on their own terms. Sometimes, when they were sedulously looked after, they assumed an air of virtue, and exacted some proofs of learning from the candidates for their favours. Sometimes, when they were not looked after, they sold their indulgences in a rather loose and profuse manner. Whether virtuous or not in the way of granting licences, they were very domineering and resolute in defence of their own existences, privileges, and dignities. Mr. Wakley, a man of the people, fighting always for the people, and through the people, did not see the justice or the usefulness of this piecemeal, self-meal arrangement. He was of opinion that, as far as was possible, medicine should be a free science and a free art, as chemistry and astronomy and mathematics are free. But, inasmuch as medicine deals with the lives of the human race, and as, therefore, for human

safety, those who practise medicine should be obliged to prove their competency, he was for legal restriction of the practitioner. To that extent he was in accord with his cotemporaries. He differed from them only when the mode of carrying out the necessary protection came under discussion, and then he differed absolutely.

The protection, he said, which the public requires must be fully granted, but it must not be a capricious protection, and of all things it must not be embarrassed with organic professional differences, so as to be a bar to independent, individual, professional freedom. All men entering medicine, at their start, should stand equal. Let them, before or afterwards, win any voluntary distinctions they can, and rise before their fellow-men to any position. Genius will carry itself, and may be left to fate and industry. But the gate of medicine, let that stand independently. Admit no man by a Royal College of Physicians more than by a Royal Society. Admit by one legal entrance, and let the broadest and most public power, the most important and the least self-interested power, keep the portal under guard. When a man well accredited comes there for admission, ask him no questions as to where he has studied, or who have been his pastors and masters; but, without prejudice, or patronage, see if he can pass through that portal; if he can, let him, and leave him to answer afterwards to and for the public according to his work and ability. Moreover, that the ordeal of passing the portal may be conducted with a fairness admitting of no rivalry and no question, let it be carried out by the State. Let the State, if it like, take into its confidence eminent representatives of medicine; let it give to the profession of medicine, altogether, a voice of representation, as the servant of the State; but let the State hold the power, and accept the responsibility. Then medicine will truly be amenable to law, and her practitioners will be legally protected by, and obedient to, a code of the simplest kind, which every one can read with understanding. Then, too, medicine will be great, because she will be an integral part of the people.

As briefly as possible I have here sketched out the plan of medical reform which the founder of *The Lancet* laid down as the basis of reform. How any public legislator in or out of the profession of medicine, how any public or private man in the profession, who is or is not deriving advantages from corporate rights, if he be clear-sighted, can hesitate to accept this basis as the one and only one upon which medical science and art can ultimately rest, is difficult indeed to comprehend. Yet this basis, so simple, so natural,

remains unbuilt on, notwithstanding that those who are most opposed to it must be sure, in their own minds, that there will be no peace until it is the acknowledged and utilised groundwork of medical organisation.

As the new journal gathered strength new objects were introduced into it. The formation of a medical benevolent fund was broached in persuasive terms, and soon a battle commenced on behalf of the principle that the ancient office of coroner, once an office held only by valiant knight or man of arms, then by any man of mark in a town or county, then by members of the legal craft, should only be held by one who could scientifically inquire into the causes of death, that is to say, by some practitioner of the medical profession. This battle was fought first in *The Lancet*; then at the polling booth by the electors, the freeholders of Middlesex; and the battle, after a preliminary defeat, was won ultimately with flying colours. The editor of *The Lancet* became the coroner for Middlesex. How excellently he fulfilled the duties of that important office I have already hinted, but I have said nothing that at all conveys what his work in that office amounted to. The labour of it, now distributed to three coroners, scarcely interfered with his other labours. He never seemed to hesitate, or pause, or tire. He never lost dignity. It mattered not where he held his inquisition—in a public-house, in a private room, in a board room—he never lost dignity. There was no one dared trifle with Mr. Wakley or wrangle with him. The members of his own profession were specially on their guard; there was that keen observation upon them in evidence which they could not ignore; and, there was that awful *Lancet* in reserve which they could not forget.

The coroner was still upon occasion the surgeon. Once on entering an inn, in High Street, Marylebone, to hold an inquest there, a woman who had fallen down was bleeding to death from a rupture of a large varicose vein in the leg. The coroner, finding that no other medical man was present, proceeded at once to put on a compress and arrest the flow. The operation over, he told the jury that had to sit before him on the case to which they had been summoned, that three times since he had been coroner he had held inquests on persons who had died from loss of blood, and who might have been saved, as he had saved the bleeding woman, if any one present had known the simple art of compressing a blood-vessel in the proper way. He gave them, in addition, the correct information as to the proper way, and explained how they might know the

difference between bleeding from an artery and bleeding from a vein.

The election to the office of coroner led, chiefly, a few years later, to his election to Parliament as member for Finsbury, in the year 1837. He continued in Parliament until a few months before his death, and in the office of coroner until his death in 1862, never neglecting in either position any important duty. Meanwhile, as editor of *The Lancet*, he held on his warlike course, "constantly in hot water, and usually coming out cool." The Council of the College of Surgeons once threatened him with criminal proceedings; they thought better of it and withdrew the action. The authorities who had charge of the lunatics of the United Kingdom nearly went insane themselves, in their anger at his trenchant, reforming, exposing hand. Dr. Elliotson, bitten by the mesmeric and clairvoyant mania, crossed swords with him on that topic, to receive, despite the protecting friendship of Charles Dickens, a series of blows which brought him, once a king amongst physicians, to a state of disfavour from which he never recovered.

In the midst of so much controversy and untiring endeavour, many times wrong in particular efforts, while right in general intention, Mr. Wakley had the foresight to predict the ultimate triumph of preventive over curative medicine, and to give a helping hand, right willingly, to the preventive system in its early developments. No one more fully understood and appreciated Mr. Edwin Chadwick's remarkable report on the sanitary condition of the labouring classes, published in 1842; and although the critical Editor was inclined to be rough upon the great Sanitarian, it was, as when Greek met Greek, in spirit of rivalry rather than anger. Indeed, in all subjects relating to the poor and helpless, no champion who ever rose for them was more chivalrous than the founder of *The Lancet*. The people were his care. He inquired into the condition of their homes; he sent his commissioners into the workhouses; he supported the parochial medical officers in all that was fair, laudable, and humane.

The last and one of the boldest acts of Mr. Wakley may be said to have crowned his strong and remarkable career. I refer to his organisation of a commission of inquiry into the subject of adulteration of the foods and drinks of the people. We all know that the details of that great inquiry were carried out by Dr. Arthur Hill Hassall, and no one but the most thoughtless, the most ungracious, the most narrow-minded, can fail to recognise the patient skill,

energy, and perseverance with which Dr. Hassall carried out his task. Mr. Wakley was amongst the loudest in commendation of this excellent analytical worker. But while we are bound to render to Dr. Hassall his fullest due, and to regret how speedily his good work has, in some quarters, been forgotten, we have to remember the strong hand that supported the labour, the mind that directed it, the will that willed that it should, in spite of every obstacle, be carried out to the letter. Action for libel followed action; but the exposures were too complete. The adulterators, like the craven rogues they were, winced and threatened, but feared to face the light of day before the public gaze. One knows not which to admire most, the merciless accuracy of the analyst, or the unflinching courage and reliance of the editor.

I have proceeded too far at this present time to find room for a number of other points bearing on the work of this medical editor. The profession of medicine, all round, may be grateful to the founder of *The Lancet*. Nay, the very men whose order he most opposed may with perfect honour admit that, in respect to their order, time alone was required to show that he was right. The work of the Royal College of Physicians, which it now is carrying out, of granting licences for general practice, a work which he long ago urged them to undertake until a State examination was commenced, would have made the College the richest and most powerful of bodies. By scorning his advice the College lost two generations of licentiates, their fees, and, of far more value, their influence. If he had had his way the Royal College would, at the present moment, have meant the whole profession in England and Wales at least, with outlying branches, if I may so say, wherever English medicine is practised.

It is, however, the great body of general practitioners of medicine who owe him most. It was for them he fought, it was their battles he won. The Medical Witnesses Act, which ensured for each practitioner some reward, if not an adequate one, for skilled service, was the fruit of his labour. For every fee which passes to every practitioner who now supplies an insurance company with a skilled report on the life of an insurer, the recipient of the fee has to thank Mr. Wakley, who not only proposed this reasonable and just demand, but, in his shrewd and business method, showed that it could be done. Through his labours the profession of medicine has already received, for its public services, from thirty to forty thousand pounds.

In the general practitioners of English medicine he had unbounded

faith. A Cromwell, a Cavour, a Gladstone had not more faith in the masses and in their cause than Mr. Wakley in the masses of his profession. In his sphere he was the leader of the rank and file to their social rights, privileges, and interests ; never forgetting, meanwhile, their higher obligations and nobler duties as the return for their improved position and influence in the world. It was his theory that the members of the main body of the profession are as capable as the most capable ; that a general knowledge of the whole field of medicine is a grander knowledge than the most refined special ; that the foundation of medicine must always be this general and applied knowledge ; that the urgent wants of mankind for medical skill, outspread on all sides, can be supplied in the total by no means less universal than by the faithful dispensation of that skill, in its total, by every practitioner ; and that, as the special and commanding talent, which lights up and commands, is, at its top of brilliancy, no more than a light from the main body of the profession from which it springs and on which it depends for its support and permanency, so the main body can, if it will, rule and govern at its pleasure throughout all its sphere.

The time, as it seems to me, has come, when this main body of medicine ought to be alive to the recognition of the labours of a leader who, with industry unsurpassed, courage unsurpassed, and judgment rarely surpassed thought such great thoughts, did such great things for them and their vocation. Never, indeed, had the profession of medicine occasion to deplore more keenly a loss by death, than that loss which it sustained in 1862, when in his sixty-eighth year, the founder of *The Lancet* ceased to be one of the moving spirits of this little world.

I have passed, for many pages, from the personal to the general, subscribing a tribute rather than a remembrance. Let me for a moment or two return to personal recollection, and so conclude.

My introduction to Mr. Wakley led to some literary work on *The Lancet*, by which I was brought into frequent communication, always of the most friendly character, with him, until my more intimate association with Dr. Robert Willis, who had but lately resigned to Dr. Alfred Swayne Taylor the editorial chair of the old *Medical Gazette*, gave me a leaning to the *Gazette*, to which I contributed many articles. Later on the *Gazette* ceased to exist as a separate journal. Mr. John Churchill bought it up, combined it with the *Medical Times*, and appointed my friend, the late Dr. Stevenson Bushnan, editor. Thereupon I went altogether, as a free lance, on

to the *Medical Times and Gazette*, and remained in that position for a period of more than twenty years.

Though for these reasons no longer associated with Mr. Wakley in literary work, and though by connection with the British Medical Association, and by helping to found the Metropolitan Counties Branch of that Association, I was really disassociated, he always remained a good friend, never failing to say a kind and encouraging word, and sometimes honouring me by sending a question which some correspondent wished to have answered, or a book for special review; while, whenever we met, I was sure to receive from him a friendly greeting, with some little exchange of repartee, which ended pleasantly. One day we met at dinner, at Wimbledon, at the beautiful home of Mr. John Churchill. Between Mr. Wakley and our host there had been a long coldness, which was now made up. The guests assembled in the garden, and there I found Mr. Wakley, taking it easy, in the sun. He came up to me with a step as young as my own. "So you have gone over to the enemy, sir," he said, taking my hand. "Yes," I replied, "and you have come over." "True," he responded, laughingly, "and a very good come too, for I shall get a good dinner by it." This led us to converse on what amount of friendship there was in a dinner. I totted it up to him numerically. "A man of twenty, living on to fourscore and a bit, could eat twenty-two thousand dinners, therefore one dinner is the two-and-twenty-thousandth part of a lifelong friendship." The idea amused him immensely. "I should have put that calculation," he observed, "into *The Lancet* in its early days; at present I shall merely tell it to John Churchill, and suggest to him what a great deal he has to make up." Then he took me aside, explained a great scheme he had in view of making the Royal Free Hospital a large medical school, and, giving me an outline of part of the programme, added with dry humour, "I am about to propose, my good friend, that you and I should hold conjointly the chair of medical jurisprudence; you to do all the work, and I to get all the glory. How do you like the prospect?" The bargain was closed, but it never fructified, the general design being soon afterwards abandoned.

At that meeting the name of Marshall Hall came up, and after that the name of Sir Charles Bell. In this conversation I asked Mr. Wakley if he had ever met Alexander Walker, who had claimed the discovery of the distinctive functions of the spinal nerves. "Yes," he replied, "he was somewhat a bore, but I had a sympathy

with the man, under the impression that he had a case which might have been better pleaded than it was. His book, handsomely bound in calf, was sent to me for review, but it was out of my line, and as I could find no one ready to tackle it fairly when it was talked about, it lies, as it has lain for years, on a shelf in my office. If you like to call for it, it is yours, and I hope you will make more use of it than I have." I did call for the work, and found it left out for me. I retain it still, as a remarkable book long buried and long forgotten. But above all I treasure it as the last kindness bestowed on me by the greatest medical reformer of the nineteenth century.

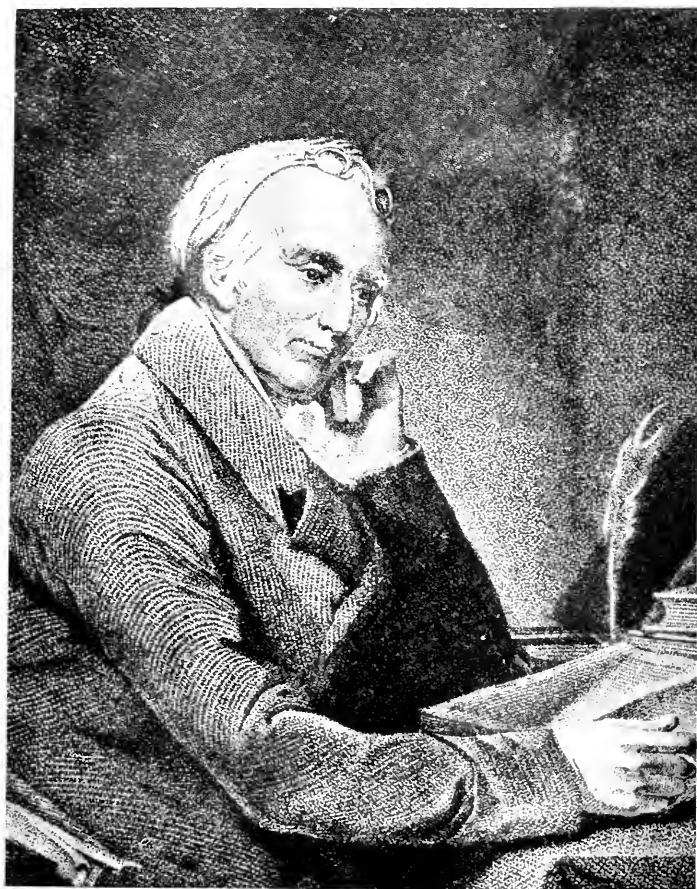
The American Sydenham—Benjamin Rush, M.D.

GREAT events and great men are twin relations. In the natural ordination this fact is ever declaring itself, and never was it more clearly declared than in the period of that great revolution which gave to the American States their united independence. In that struggle for freedom the men who wrought the change came to the front as if they were called, each specially fitted for the duty he had to perform, and doing it as well as it could be done.

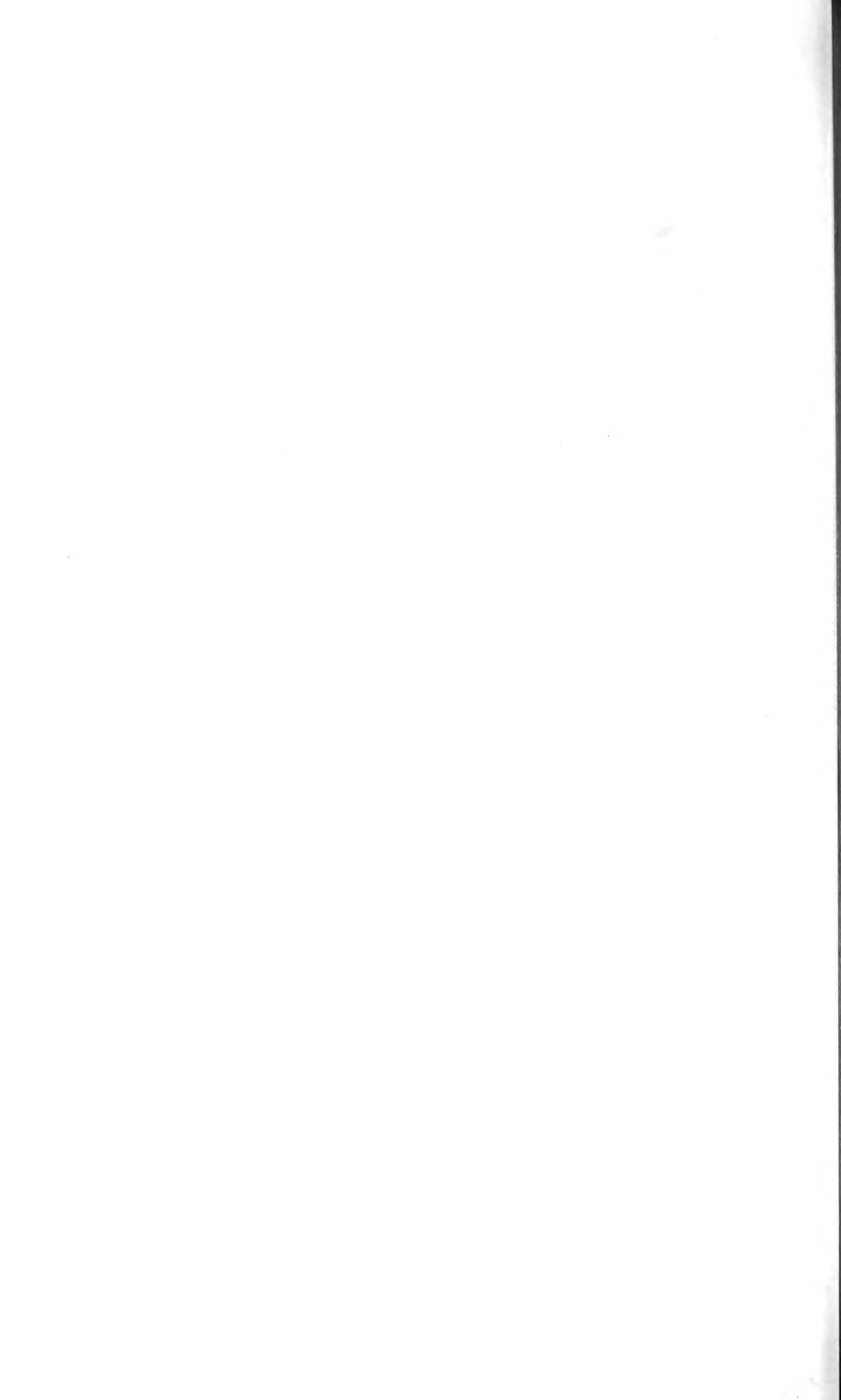
If the pleasures of hero-worship were not so overwhelming there would be nothing whatever peculiar in these combinations, inasmuch as great men are always present when they are wanted and called for. But, like the crowds at a theatre who concentrate all their admiration on the actors without thought of the playwright, whose creations and instruments the actors are, so the crowds of hero-worshippers, looking on the mighty stage of human history, greet the actors, the historic elect, as if the elect, of their own will and deed, were the powers, and as if the concealed and inscrutable energy which governs and directs everything did not exist.

At the foundation of the great Republic of America, one of the conspicuous actors was the Æsculapian scholar, Benjamin Rush, of Philadelphia. This man his admiring contemporaries—and they were many—designated the Hippocrates of Pennsylvania. Hero-worship with a vengeance !

But Rush was, nevertheless, a great as well as a conspicuous character, worthy of his time, and one of the elect of history. Our Isaac Lettsom, less enthusiastic and more precise than the native worshippers, styled him the American Sydenham, a title which holds fast. "Rush," says Lettsom, "approached, if not exceeded, Sydenham in grandeur and compass of thought, though less



BENJAMIN RUSH, M.D.



discriminating in that felicitous arrangement of medical phenomena which distinguishes Sydenham, whilst his theories were less consonant with nature. To Sydenham the motto *conamen naturæ* is most applicable; to Rush, *nullius in verba*. To this opinion the illustrious Dr. Thomas Young has added respecting the American Sydenham:—"His accurate observations and correct discrimination of epidemic diseases well entitled him to this distinction, while in the original energy of his character he far excelled his prototype."

Rush was of English family. One of his ancestors, a Commonwealth man, was a favourite captain under the Lord Protector. William Cobbett, alias Peter Porcupine, in a satirical work he wrote on Rush, under the absurd title of the *Rushlight*, a work I shall have to refer to in a future page, made a paltry attempt to run down Rush by proclaiming that John Rush, his father, "honest John," was of English extraction, and by calling a blacksmith, and that his mother, a very kind and pious Presbyterian, "kept a huckster's shop or stall, and, recollecting the apostle's remark respecting the salubrity of wine for the stomach's sake, occasionally administered to the comfort of her fellow-creatures by retailing drams." Cobbett, there is no doubt, wrote this under feelings of bitterest irritation, but it was unworthy of him in every way. It was no disparagement to Rush if what he said were true; but it does not seem to have even the merit of truth, for the other biographers state that the father of Benjamin Rush was a farmer, and that he, Benjamin, was born on his father's farm in Byberry township, near Philadelphia, Pennsylvania, on December 24th, 1745.

Benjamin Rush studied, in his first days, at the College of New Jersey, and in 1760 took his preliminary degree in arts. He next, for six years, pursued his medical studies as a pupil of Dr. Redman of Philadelphia, and thus prepared, after the excellent custom of those days, for entry on a course of systematic collegiate study in medicine, he proceeded to Edinburgh University, then in its rising glory as a medical school. Here the young American lived and worked for two years, and in 1768, being now twenty-three years old, took his Doctor's degree in medicine. His thesis, which was published in 1786, and of which there is a copy in the library of the British Museum, entitled *Dissertatio de coctione ciborum in ventriculo*, was greatly esteemed, and seems to have given him a good name as an original thinker from the very outset of his career. From Edinburgh he proceeded to London for further study, and

from London to Paris, passing the winter of 1768 and the summer of 1769 in the medical schools of those cities.

Returning to Philadelphia in 1769, Rush was elected to the Chair of Chemistry in the College of Philadelphia, and continued in that office until 1789, when he took the Chair of the Theory and Practice of Medicine, which he held for two years. In 1791, the Philadelphia College was raised to the rank of a University of Pennsylvania—and with that change the Professor of Theory and Practice of Medicine was appointed Professor of the Institutes and Practice of Medicine and Clinical Professor; and, in 1796, of the Practice of Physic proper. In these offices he remained actively engaged up to the period of his death in 1813.

Throughout the whole of his career Dr. Rush was always the physician. His heart, his soul, his strength, were wholly devoted to professional work and professional welfare. In his early days he was so absorbed in his studies and in his practice that the pleasures of domestic life were held in abeyance. He declined to marry until he felt that the cost of his medical researches would not be trespassed on by home necessities. Twitted on this subject by an old friend, Dr. Ramsay, he wrote in reply: "Medicine is my wife; science is my mistress; books are my companions; my study is my grave."

At last, even this stern student was compelled to submit to gentler fate, and in 1777 he married Miss Stockton, daughter of Richard Stockton, of New Jersey, one of the successful rebels against Great Britain. The marriage seems to have been in every way suitable, happy, and in no way injurious to the work of the enthusiast, who so sorely dreaded the result of family responsibilities.

The success of Dr. Rush as a physician in his native city appears to have been safe from the first, and he devoted his energies so earnestly to its cultivation that he ever steadfastly maintained it. At the same time he was no slave to mere practice. Possessing a brain as resolute as it was active and powerful, he permitted himself to be a politician, a man of letters, a scholar, and a philanthropist. He was declared, by one who knew him best, to have been a public writer for a period of forty-five years, and few social, political, or scientific subjects escaped his comment or criticism. To him, says Ramsay, "every place was a school, every person with whom he spoke a tutor." He kept a note book which consisted of two parts. In one part he entered facts as they occurred under his observation; in the other part he entered ideas and observations as they arose in his own mind, or were suggested by others in the course of con-

versation. He possessed also the very useful faculty of reading or writing with the utmost composure in the midst of the noise of children, the conversation of his family, and the commonplace interrogatories of his visiting patients. In this facility he resembled Joseph Priestley, who wrote many of his most learned essays and works by his fireside, with his family and friends around him.

The trying political events by which, for a time, he was encompassed, engrossed, as was natural, much of the attention of our American Sydenham. Like his prototype, he was a man whose sympathies were with the people and the liberties they fought for. He was amongst those who, in 1776, drew up the declaration of independence, and his name appears, with that of his wife's father, Richard Stockton, as one of the most distinct on that famous document. He took, moreover, an active part in the military work by which the victory of independence was won. In the early part of 1777 he was made Surgeon-General, and in the summer of that year Physician-General of the military hospitals for the Middle Department of the States. In this capacity he gave his skilled attention to his wounded compatriots of the battles of Princeton and Brandywine. For these and for his general services to the cause of independence he was elected a member of the Convention of Pennsylvania for the adoption of the Federal Constitution, and, in 1799, was made Treasurer of the United States Mint, a post which he held for the remainder of his life. His political opinions were in some respects chequered. In respect to the great demonstration, the institution of independence, and the establishment of the Republic of the United States, he was always of the same mind. In that he gloried. But he differed with many of his compeers, and even with the illustrious chief Washington himself, on various social, political problems. Thus he was amongst the first to raise his voice against the institution of slavery, and to indicate what danger to the future integrity of the United States was concealed in that dark shadow. He was opposed also to the punishment of death, for reasons as soundly thought out as they were eloquently expressed. In his later days, Rush tempered the fire of his energy by a system of Christian discipline which might be called primitive in its expression. "I have been alternately called," he wrote, "an aristocrat and a democrat ; I am now neither. I am a Christocrat."

In this spirit he defended Republicanism. "A Christian," he urged, "could not fail to be a Republican, for every precept of the Gospel inculcates those degrees of humility, self-denial, and brotherly

kindness, which are directly opposed to the pride of monarchy and the pageantry of a court."

The public utterances of Rush becoming numerous, they were brought out in 1798 in a volume, under the title of *Essays, Literary, Moral, and Philosophical*, and were dedicated, as a record of fraternal affection, to his brother, Jacob Rush, Judge of the Third District of Pennsylvania. It would be difficult to determine which amongst the many essays making up this curious and rich volume is the most advanced and most useful. Let me, as briefly indicating the prescience of the man, select a thought or two from a few of them.

EDUCATION OF WOMEN.

In an essay on the education of women, Rush leads the way boldly and uncompromisingly for the fullest, and freest, and highest education. "Let the ladies of a country be educated properly, and they will not only make and administer its laws, but form its manners and character. It would require a lively imagination to describe or even to comprehend the happiness of a country where knowledge and virtue were generally diffused among the female sex." From this, as a preamble, he sets forth what might happen in America if, as a new country starting on her new foundations, she were to bring up her daughters with the same educational advantages as her sons. He hopes she may, but he is not enthusiastic. In the course of human affairs, America, he fears, will too soon follow the footsteps of the nations of Europe in manners and vices, and that the first marks of declension will appear amongst the women.

ON OATHS.

In another essay he objects to the ceremony of taking oaths. To this ceremony there are, he inculcates, two sets of objections—one founded on reason, the other on the precepts and the spirit of the Christian religion. In respect to the reason, he argues that oaths are harmful, because they produce in the minds of men an idea that there are two kinds or degrees of truth—the one intended for common, and the other for solemn occasions; an idea directly calculated to beget a want of reverence for the inferior kind of truth, by which men are led to trifle with it in the common affairs of life. It is true that some men will tell the truth when urged to it by the solemn formalities of an oath; but this proves the great mischief of oaths in society; for as men are called upon to speak the truth

nine hundred and ninety-nine times in common life to one time when they are called upon to swear to it, the truth is imperilled the same as if there were two kinds of it. There is a scale of falsehood, but truth has no degrees, no subdivisions. Like its divine Author, it is an external and unchangeable unit. Again, the taking of the oath is an instance of the bases of profane swearing, because if there are two modes of speaking the truth, it is natural for men to prefer that mode which the laws of the country have entitled to the first degree of credibility; hence men swear when they wish to be believed in common conversation.

PUBLIC PUNISHMENTS.

In another essay he exposes the injurious influence on the mind of public punishments. Against such scenes he argues on various grounds. They cannot reform a criminal, because, as the punishment is always connected with infamy, it destroys in him the sense of shame, which is one of the strongest outposts of virtue; and experience proves that public punishments have multiplied the propensities to crime. Moreover, public punishments, so far from preventing crimes by the terror they excite in the minds of spectators, are directly calculated to produce crimes; for all men when they suffer discover either fortitude, insensibility, or distress. But fortitude is a virtue, and is admired. "I call upon you," said Major André, at the place of execution, "to bear witness, gentlemen, that I die like a brave man." The effect of this speech on the American army is well known. "The spy was lost in the hero, and indignation everywhere gave way to admiration and praise." Insensibility removes instead of exciting terror. Distress of all kinds, when *seen*, produces sympathy, a disposition to give relief, and palliation even to crime.

INCONSISTENCY OF PUNISHMENT FOR MURDER BY DEATH.

Rush was amongst the first of philanthropists to oppose capital murder, or committal of murder by the State for the purpose of setting an example to individuals not to commit murder. His reasons for opposing capital murder are well founded. It lessens the horror of taking away human life. It multiplies murder from the difficulty it creates of convicting persons who are guilty of it. It checks the operations of universal justice by preventing the punishment of every species of murder. Respecting murderers Rush was

of opinion that there are many crimes which unfit a man for human society more than a single murder, which may have been the effect of a sudden gust of passion, and has sometimes been the only stain of a well-spent or inoffensive life. He also maintains that there have been instances of murderers who have escaped conviction, and have afterwards become peaceable and useful members of society. "Let it not be supposed," he adds, impressively, "that I wish to palliate by this remark the enormity of murder. Far from it. It is only because I view murder with such superlative horror, that I wish to deprive our laws of the power of perpetrating and encouraging it."

PLAN OF A PEACE OFFICE.

Amongst the other original projects of Dr. Rush was one for the establishment of a peace office for the United States. He proposed that there should be a great state officer, who should be the Secretary of State for Peace. This officer should have control over all the free schools in every city, village and township in the States. His efforts and influences were to extend to many details of common life, but his great work would be to subdue that passion for war which education, added to human depravity, has made universal, by familiarity with the instruments of death, and by great military shows. Through his influence militia laws should everywhere be repealed, and military dresses and military titles should be laid aside, as well as military reviews, which tend to lessen the horrors of a battle by connecting them with the charms of order. Through the same influence military dresses and titles, which fascinate the minds of young men, and lead them from serious and useful professions, should be discarded, because, were there no *uniforms* and no *military titles*, there would probably be no armies, and no titles to feed vanity and keep up ideas in the mind which lessen a sense of the follies and miseries of war.

A PARADISE OF SLAVES.

A remarkable little paper, under the title *A Paradise of Slaves*, describes a dream that Rush had, in which he felt himself transported to some new world, where slaves were enjoying an eternal blessedness. The life history on earth of some of these is given from their lips, and as the narratives were, obviously, founded on the real histories of some wretches who had fallen under the blows or

cruelties of their masters, the narrative, dream as it was, went home with no trifling effect. In a more connected and artistic way Mrs. Beecher Stowe raised a fire of sympathy, which shone the world through, by her *Uncle Tom's Cabin*. But the first spark of that fire was kindled by Benjamin Rush, and the spark was never extinguished. It hung like the lamps in the temples, keeping alive the souls of men to the supreme iniquity it exposed, until, though not without awful bloodshed, the iniquity was abolished for ever.

THE INFLUENCE OF PHYSICAL CAUSES ON THE MORAL FACULTIES.

In a splendid oration on this subject Rush defines the moral faculty as a power in the human mind of distinguishing and choosing good and evil. "It is a native principle, and though it is capable of improvement by experience and reflection it is not derived from either." He considers that Paul and Cicero give the best definition of the moral faculty—Paul in Romans ii. 14, 15, Cicero in the far-famed *Oratio pro Milone*,*—and he is careful to distinguish between it and conscience. "The moral faculty is what the schoolmen call the *regula regulans*—conscience is their *regula regulata*. The moral faculty performs the office of a law-giver, the conscience of a judge." "The moral faculty is to the conscience what taste is to the judgment, and sensation to perception." The total absence of the moral faculty he styles ANOMIA, the weakened action of it MICRONOMIA. Thence he studies the influence upon it of various physical causes, climate, diet, certain drinks, excessive sleep, bodily pain, cleanliness, solitude, silence, music, eloquence of the pulpit, odours of various kinds, light and darkness, medicines, imitation, habit, association, sensibility, cruelty, attraction, composition, decomposition, each of which influence is itself made a subject of study. The oration—delivered at the invitation of the Philosophical Society of Philadelphia before the President of the State, the Supreme Council, and the members of the General Assembly of Pennsylvania—closes with a glowing tribute to Benjamin Franklin, a man "who appears to have been lent to mortals on purpose to render our globe a more convenient and safe habitation for the children of men."

* "Est igitur hæc, iudices, non scripta, sed nata lex, quam non didicimus, accepimus, legimus, verum ex natura ipsa arripuimus, hausimus, expressimus, ad quam non docti, sed facti; non instituti, sed imbuti fumus."

ON MODE OF EDUCATION.

On the education of youth, Dr. Rush held a view which, in its day, was considered to be singular in the extremest degree. An eminent scholar and philosopher, David Rittenhouse, had said to him, "I once thought health the greatest blessing in the world, but I do not think so now. There is one thing of much greater use, and that is time." To me this saying does not seem to be of much weight, inasmuch as time without health is a burthen, but it impressed Rush with the idea that to save time was a matter of primary moment for the young. He, therefore, suggested that five years spent in learning the dead languages, to the exclusion of other branches of learning more directly practical, was an ancient mistake. He did not wish the knowledge of the Latin and Greek languages to be extinct in the world. Far from it. His wish was to see such knowledge preserved, like the knowledge of law or medicine, by a distinct profession, devoted to the study of those languages. His arguments in favour of this change were that it would perfect the English language by checking the increase of derived superfluous words; that it would quicken the advance of science by dismissing the fetters of ancient words; that it would destroy the prejudices of the common people against schools and colleges in which the pupils are taught to call a horse or a cow by two or three different names, while they are taught nothing as to the qualities and uses of these valuable animals; that it would be a means of banishing pride from the seminaries of public education, men generally being most proud of those things that do not contribute to the happiness of themselves and of others; that it would increase the number of students in the colleges; and that it would remove the present immense disparity which subsists between the sexes in the degrees of their education and their knowledge.

Such are a few of the general lessons taught by our versatile scholar. If I had a volume to dispose of instead of a few poor pages I could fill it with his thoughts. As it is, I have ventured to make a selection in the briefest form, that, at least, the reader may taste their quality, and form some idea of the excellency of the whole from the spirit of one or two of the distinctive parts.

In a sentence, Benjamin Rush, more than a century in advance of his time, led the way to reforms, some of which, fully accomplished, have been amongst the most beneficent ever bequeathed from man

to man. His greatest idea, the Court of Peace, remains still in the future ; but that it, too, is coming, is clear to all who have eyes to see that military glory is day by day receding ; that uniforms are sinking into liveries ; and that they who are the most successful leaders in the field of war are but ordinary men when they return to the paths of peace.

RUSH AS A PHYSICIAN.

The unfriendly Porcupine, William Cobbett, depicts Rush as riding out to see his patients "in a queer-looking hutch, big enough to hold only one man." "It has a glass door and windows ; it is drawn by one horse, and has an elevated box, from which a negro-fellow lashes his poor four-legged fellow-citizen."

To such keen caricature Rush was not insensible, but he bore up bravely against it ; and although, according to our modern views, he may have been in error in one direction of practice, blood-letting, the error, conscientiously carried out to a degree almost without a parallel, did not spring from himself. It was a part of his education, and had its virtues as well as its vices.

In his character of Physician we may look upon Rush as a Healer, a Sanitarian, an Orator, a Man of Letters, and a Teacher. Within the strict lines of the accomplished Physician, he was remarkably conspicuous in all these departments.

Six volumes of medical inquiries and observations ; a letter to Lettsom on the cause and cure of tetanus ; a paper on the new method of inoculating for the small-pox ; a letter to Dr. Miller on the spasmodic asthma of children ; on the effects of spirituous liquors on the human body ; and various other observations of a practical kind, indicate that, as a representative of the curative school of medicine, Rush was one of the best informed and advanced physicians of the eighteenth century. His reputation as such has, however, from peculiar circumstances, been made to rest too exclusively on his work published in 1794, on *The Bilious Remitting Yellow Fever, as it appeared in the City of Philadelphia in the year 1793*.

It was for the position he took during this great epidemic that Rush came under the lash of William Cobbett—then living in Philadelphia, and editing, under the name of Peter Porcupine, the *Porcupine Gazette*—a lash so severe that the physician brought an action against the editor, gained a verdict of five thousand dollars,

and therewith an enemy more implacable, keen, and violent, than perchance any other son of Æsculapius ever encountered.

In the treatment of the fever Rush adopted the system of the freest blood-letting, combined with mercurial purges. On the merits of this system, or the demerits, Cobbett founded his attacks, and, as the judge expressed at the trial, was as merciless on the man as on the system. Rush in practice followed the French Botallus. Botallus was the bleeder whom Le Sage had characterised under the name of Sangrado; hence to Rush, Cobbett applied the name of the Sangrado of America. Sangrado was looked upon in Valladolid as another Hippocrates, therefore Rush was known by the name of the Hippocrates of Pennsylvania. These were only a few of the bitter tauntings of the fierce English satirist, whose hand, up to the close of his life in our own country, in 1835, never lost its cunning; whose vigour was such that he left behind him a hundred political volumes; and whose hate was so intense that he used as a motto, from Swift, "If even a flea bite me I will kill him."

I have read through all the storm of Cobbett and the defence of Rush. I wish I could put my pen through both. Very little that Cobbett said and wrote is more than mere rashness and fury. Very much that Rush did had, perchance, better been left undone, for his own history of the bleedings he carried out makes us start, in these days. From Mr. Peter Mierken he drew one hundred and fourteen ounces of blood in five days. From Miss Bridges, in the ninth year of her age, he drew thirty ounces of blood in five bleedings, and so on and on. His justification of the practice was that his patients recovered when the bleedings were most copious. Yes, responded the *Porcupine*, but his sister and pupils died in his own house, blood-letting nevertheless.

Whoever wants to read a wonderful book will still read Rush, *On the Bilious Remitting Yellow Fever*. The copy before me, and which I have just read through, had not one leaf in it cut until my paper-knife visited it. It had lain ninety years in its original sin, as Porcupine would have declared; but, surely, a more interesting reading was never secured at so little trouble. It has been the carriage book for a week, and has never tired. There is a final chapter in which a description is given of Rush's own sensations during the period of the epidemic. It is as if he were talking to you, a ghostly whispering, through a veil of nine-tenths of a century.

As a Sanitarian Rush shines cloudless altogether. Few physicians,

indeed, have, in any age, been more advanced in sanitation than he. Fresh air, cleanliness of body and mind, temperance, industry, active purity all life through, were his watchwords. Debility, from idleness and sloth, he never ceases to expose and condemn. "The clown who supposes the crooked appearance of a stick when thrust into a pail of water to be real, does not err more against the laws of light than that physician who mistakes the debility which arises from oppression for an exhausted state of the system, and attempts to relieve it by stimulating medicines."

Of intemperance he saw almost all the evils, and never tired in raising his voice against it. He calculated that in the United States, in his day, four thousand persons died annually from intemperance—an estimate not far out of proportion with what, despite his warning voice, occurs there and here at the present time. He told the intemperate to abstain, not drop by drop, but "suddenly, entirely." "Touch not, taste not, handle not." He showed the stages of the disease of drunkenness in eleven figures of expression, quite worthy of re-publication. And to his professional brethren he wrote: "Give as few medicines as possible in tinctures made with distilled spirits. Perhaps there are few cases in which it is safe to exhibit medicines prepared in spirits in any other form than drops. Many persons have been innocently seduced into a love of strong drink from taking large or frequent doses of bitters infused in spirits. Let not our profession be reproached in a single instance with adding to the calamities that have been entailed upon mankind by this dreadful species of intemperance." Finally, to support all he had said on this topic, he, with more care and precision than any previous medical observer, defined the physical and mental diseases which take their distinct origin from the alcoholic destroyer.

Against the use of tobacco he was equally explicit, and in his condemnation of snuff-taking was unsparing. He calculated that a confirmed snuffer lost five days' time out of every year in the mere act of lifting the snuff from his box and drawing it into his nose.

As an Orator Rush makes a distinguished figure. His orations on the famous Dr. Cullen, of Edinburgh, once his honoured master, and on his friend David Rittenhouse, are models of eloquence in reason and sentiment. I quote one passage from the eulogy on Cullen as an example. It is a golden utterance.

"That physician has lived to little purpose who does not leave his profession in a more improved state than that in which he found it

Let us remember that our obligations to add something to the capital of medical knowledge are equally binding with our obligations to practise the virtues of integrity and humanity in our intercourse with our patients. Let no useful fact, therefore, however inconsiderable it may appear, be kept back from the public eye; for there are mites in science, as well as in charity, and the remote consequences of both are often alike important and beneficial. Facts are the morality of medicine; they are the same in all countries and throughout all time."

As a Man of Letters, Rush deserves the highest praise. His style, always clear, concise, straight, is often rich, poetical, eloquent. He is so attentive to his own precept on the value of facts, that he drops, incidentally, as trifling observations, what smaller men would bring forth as the treasures of their minds. Thus in reading him the student is ever gathering side views which illustrate time and history without for a moment loosening the thread or the full force of the argument. We learn, to take a single instance of this kind, in the essay on the Bilious Remittent Fever, that children inoculated for the smallpox sometimes died from erysipelas, commencing at the seat of the punctures—a fact indicating that inoculation, like vaccination, had its primary dangers.

His facility as a writer was equalled only by his industry, his facility and industry only by his versatility. To Sir John Sinclair's *Code of Health and Longevity* he added a commentary on the state of the body and mind in old age. To Botany he contributed a paper on the *Sugar Maple Tree*. Not content with his own writings, he edited those of Sydenham, Sir John Pringle's *Diseases of the Army*, and the works of several other authors of lesser distinction. He also wrote an account of Christopher Ludwick, Baker-General of the Army during the Revolutionary War.

As a Teacher he was considered unequalled in his time and country. He had under his tuition over two thousand three hundred pupils, and he published no fewer than sixteen anniversary addresses on medicine. He contended that composition and speaking are the same art, and that men who commence to compose in early life never repeat themselves, as less trained men do, in extemporary exposition.

Dr. Rush continued, in his life of activity, sleeping little, working

much, until April 19th, 1813, when he died, somewhat suddenly, in perfect peace, and in the midst of such universal sorrow, that as he lay in death crowds of the poor of his city besieged the house praying to be permitted to see his face once more, or even to touch his coffin when that was closed.

One fine day in the past glorious summer, wandering through Greenwich Park with two men of kindred genius, each in his way choice companionship, Weir Mitchell, of Philadelphia, and Thomas Woolner, our great English sculptor;—Woolner, vivacious as the glinting light through the foliage, and Mitchell, dreamy as the shades—I touched the Philadelphian into energy by asking him without premise:—

“Do you know anything of Benjamin Rush?”

“Just a little,” replied he. “Why do you ask about him?”

“I want him for an ASCLEPIAD.”

“I’ll get you his portrait and some books relating to him.”

“Who was Rush?” inquires Woolner.

“One whom you might sculp for Philadelphia, my dear R.A., but Mitchell will tell you more of him than I.”

And Mitchell responded so brightly, I would I could remember all he told. Suffice it that from the stimulus of his narrative, and a generous loan of books by my friend Henry Stevens, F.S.A., of Vermont, I have done my best to call up, for a moment, one of the most original and powerful men whom medicine has ever claimed for a son.

To compare Benjamin Rush with Hippocrates is fair to neither; and although, after Lettsom and Young, I have called him the American Sydenham, that is scarcely fair.

Benjamin Rush was the first great American physician *sui generis*.

Vesalius, and the Birth of Anatomy

THE STUDENT.

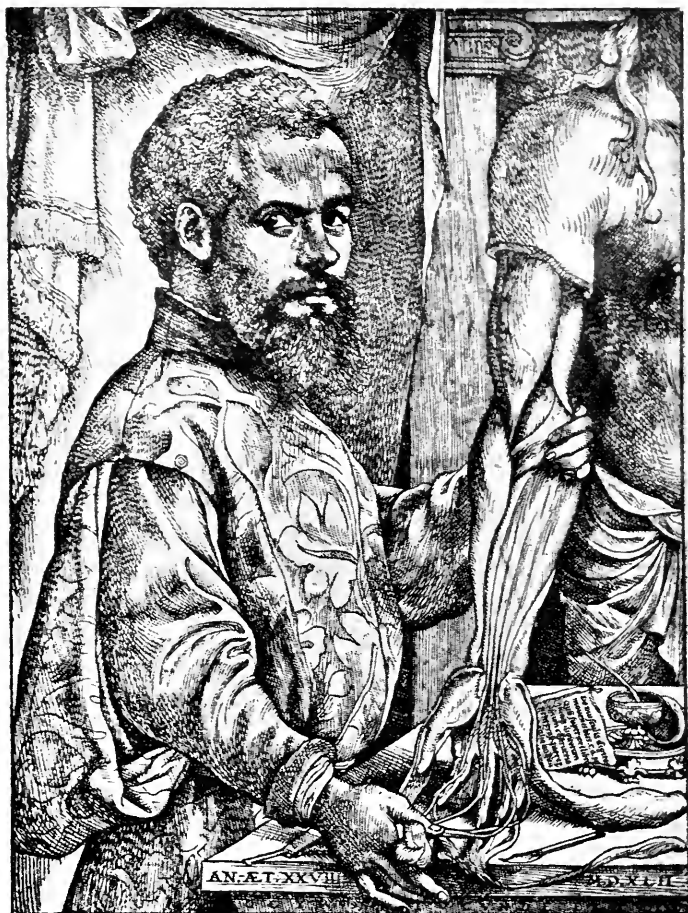
THE title, *Father of Anatomy*, applied so often to Andrew Vesalius, is and is not deserved. Vesalius was not the father of anatomy, and yet it is very doubtful if any great and immediate advance in anatomy would have been made in the sixteenth century unless he had lived and laboured. The combinations of physical and mental qualities which met in this man were as rare as they were remarkable and potent. They were what were precisely wanted for the great task, a task as hazardous as it was momentous.

Vesalius was, physically, of perfect cast. His strength was linked with activity—always a happy blending. He must have had the strength of manhood while yet in his adolescence. His mental activity ran in richest vein. He was an artist, a handicraftsman, a writer, an observer of nature, a maker of history. He was courageous, calm, self-contained, incessantly industrious.

His gifts—his mental gifts at any rate—were gifts descending to him. In this sense he was what we now call a Galtonian study, like the last Darwin. His great-grandfather, John Vesalius, was a learned physician—physician to Mary of Burgundy, the first wife of Maximilian the First. His grandfather, Everard Vesalius, also a physician, was a scholar and classic, translator of some parts of the works of Hippocrates, Galen, and Rhazes, and thereby a celebrity. His father, Andrew Vesalius, apothecary to Margaret of Austria and to Charles V., was of honourable repute.

The family name, originally, was Wittings, but for some generations before the birth of the anatomist, the name of Wesele, or Vesele, had been assumed by them, after a small town of that name in the Duchy of Cleve, which they claimed as their native place.

Our Vesalius, Andrew by Christian name, was born on the last day of the year 1514, in Brussels. His earliest tastes were for anatomy



And. Vesalius



and the dissection of lower animals. For what else he was in youth distinguished we have no record, but so soon as the years of boyhood were passed in the University of Louvain, he was, after a season at Montpellier, in Paris studying human anatomy under Sylvius, at that time the light of his age, and still a light, through his researches on the brain, by which he is ever identified.

THE ANATOMIST.

After the close of his studentship, shortened probably by the commencing jealousy of Sylvius and the school he had founded, our Vesalius returned to Louvain. Here he became an anatomist, admired and feared, adventurous and resolute. On a gibbet outside the little university town hung the remains of a malefactor. The temptation was too great for the ardent Vesalius, full of youth, energy, and scientific zeal. He, therefore, aided by another student, must needs rob the gibbet of its treasure—bones that had been picked clean by the birds and blackened by the sun. To remove the bones of the limbs was not difficult, but the iron shackles binding the trunk to the gibbet, were obstinate. So the students after the gates of the town were closed, remained out all night to complete their task. At last, when they had the prize in their possession, the question arose what they should do with it, for carry it into Louvain they dare not. So they buried it wholesale, afterwards removed it piecemeal, fitted it together in secret, and brought it forth as a purchase from Paris.

From Louvain Vesalius travelled into Italy, keeping anatomy always first in sight as the study of his life. Finally, after serving for a time as an army surgeon, and taking part in the campaigns of the Low Countries and in France, he settled at Padua, a professor in his twenty-fourth year, and, in the great school of medicine there, taught his favourite art from 1537 to 1544.

It is probable that Vesalius left Paris about the year 1533-4. He had already commenced the study of his immortal work, on the fabric of the human body; indeed, it has been said that in Paris itself, and under the very eyes of Sylvius, the project had its birth. However this may be, it began, it continued, it grew into perfection, and in the year 1542-3, after three years of close application to it, it saw the light, published under the title *De Humani Corporis Fabrica*.

The great work was heralded by the publication of six plates of

anatomy, *Tabulæ Anatomicae*, in 1538. They were prepared and issued for the use of students, and were largely sold. They are numbered as follows :—

1. The portal system and organs of generation.
2. The Venæ Cavæ and chief veins.
3. The Great Artery—Arteria Magna—and Heart.
4. The skeleton in its anterior view.
5. The skeleton in its side view.
6. The skeleton in its posterior view.

The work was dedicated to Narcissus of Parthenope, “the model physician of the time.” This was Narciso Verdunno, first physician to the crown of Naples in 1520, and in 1524 first physician and councillor to the Emperor. The plates were drawn by an artist to whom reference will again be made, John Stephan de Calcar. As a frontispiece to the plates, drawn probably by the same artist, there is a picture of Vesalius giving a demonstration to a host of strange-looking admiring pupils, from the dissected body of a woman.*

At a bound, *De Humani Corporis Fabrica* stood forth the foundation of Human Anatomy. For admiration, for criticism, for learning, three subjects were thrown open to admirers, critics, scholars. There were the dissections, there was the text, and there were the plates. These vied with each other. Well might Sylvius rave, and his pupils glow with jealous rage.

It is my intention a little farther on to put forward a brief description of this famous volume. Before doing so, it will be but honest to indicate what were the objections made to it by the enemies of its author.

The opposition was not much divided. There were few, if any, who denied the greatness of the effort, but there were many who united in denouncing it as stolen light, stolen with ungenerous concealment of its prime sources, or, with still worse conduct, ungenerous reference to and scorn of masters who had previously struck the light and held it up to the stealer. Let us see to whose fame Vesalius was thus sacrificed.

To Sylvius some have given the palm. Sylvius was noted for

* My late friend Sir William Stirling Maxwell republished, in 1874, a fine edition of the work *Tabule Anatomicae* with the frontispiece. The volume was intended for private circulation only, but a presentation copy will be found in the Library of the British Museum.

oddity as well as for science. He was a miser—"avarice itself"—and as such the hero of many tales and jokes. It is told of him that he fed his servants on dry bread, would never allow a fire, and in cold weather, instead of throwing wood on his hearth to burn and make warmth for his body, he would play at football, or take a large log, throw it over his shoulder, and run about with it in the open air in order to obtain animal warmth and save the cost of fuel. Once, but once only, was he known to seem hilarious, and when his friends wondered much why such a fit should seize him, he explained the reason. He had dismissed his "three beasts, his mule, his cat, and his maid." To such a man, tenacious of all that belonged to him, mentally and physically, young Vesalius would necessarily be very troublesome, and as Sylvius determined to remain the master, a school of pupils, springing from him, arose to declare the order of the master and to denounce the pretensions of the new and youthful professor.

Eustachius has been brought into comparison with Vesalius. It was asserted by the opponents of Vesalius that Eustachius prepared an anatomical work, which, illustrated by copper-plates, surpassed all that had gone before. But where was this work? It was lost. It was lost for one hundred and thirty-eight years after the death of its author. It turned up in the year 1712; Eustachius died in 1574.

Fallopian has been set off against Vesalius, and his position in the great school of Padua gave a fair colour to the suggestion. The character of this man, blameless, industrious, learned, and beloved, intensified the partisan admiration for him and his fame.

It would be useless to adduce any other lesser contemporary names connected with this controversy, and it would be unfair to Vesalius to permit those I have named to stand on his level. They were all great in their way, but their greatness, compared with his, lay, if I may so express it, in its lessness. They were conspicuous for the close attention they paid to particular parts, Sylvius to the brain, Eustachius to the organs of sense, Fallopian to the uterus and its appendages; and from their special studies in these particular directions they connected their names so intimately with the parts they dissected and described, that their names have become, like the parts themselves, one and the same in literature:—"the fissure of Sylvius;" "the Eustachian canal;" "the Fallopian tube."

But compared with Vesalius, who can scarcely be said to have left his name specially connected with any organ or structure, these

anatomists are of secondary constellation. Vesalius left his name with the whole fabric of the human body.

Two other men, whose names cannot be omitted, remain as men who share with Vesalius in fame, and in them his enemies had a cause which, although rather unfairly enforced, was of weight and consequence. These two men were Mondinus and Galen.

Mondinus, nearest in point of time to Vesalius, being a little more than a century before him, set the world at defiance by dissecting the bodies of the human dead, and by describing the dissections. In 1306 Mondinus dissected a human body; in 1315 he dissected the bodies of two women, and he published a work, with illustrations, which up to Vesalius was the text-book, the *vade mecum* of all the schools in which anatomy was taught, and of all the professors of the art.

Mondinus deserves a separate history, but here he can only be named in this casual manner. He opened the narrow way which Vesalius transformed into the highway of anatomy.

The other anatomist, much further back than Mondinus, was the man of the magic name—Galen, the second father of physic after Hippocrates. Him the opposing contemporaries of Vesalius were loud to extol as one from whom the modern upstart had stolen without recognition. The seventeen golden Galenic books, *De Usu Partium*, were put forward as the fountain heads of the Vesalian labours. The description of the human hand in the first and second of the Galenic books; the description of the difference in the foot of the ape and the foot of man; the description of the brain and nerves; these and many other details were adduced to indicate that Galen had dissected the human body, had defined the parts with scientific precision, and had afforded Vesalius the groundwork of all his studies and their results.

I do not think we ought to deny to Galen that he helped Vesalius: as well deny to Aristotle that he helped Galen. But in spite of all we may claim for Vesalius the title of Father of Anatomy, in the sense that before him there was no compact science, no model, truly no book of anatomy. It is easily to be conceded that Vesalius, in his early student life, had, to the best of his ability, made himself master of all that had gone before him. Upon that learning he rested, systematized, and progressed. From that learning he dissected the human body as no man before had done.

In these remote days, with all passion on the Vesalian controversy over and long buried, we may admit much that the foes of Vesalius

said, while we still recognise in him the Father of Anatomy, whose genius was incomparable industry, and who wrote his own immortality in the immortal work to which it is now time to turn for brief study.

DE HUMANI CORPORIS FABRICA.

The work first appeared in 1543. It was printed at Basle by the famous John Oporinus, printer and professor of Greek there. The copy I am writing from, in most perfect condition—lent me by my learned brother Henry Stevens, F.S.A., of Vermont—is the German edition—Nuremberg, “Anno Salutis, MDLI,” with copies in full of the original plates, models of artistic skill.

Giving all the credit of the dissections to Vesalius, the first thought that occurs is, Who was the artist who made the drawings from the dissections?

It has been supposed that no less a hand than that of Titian worked here for Vesalius, but not a line is left, as a name, to prove the suspicion. Still it might be correct. Titian and Vesalius were friends. Titian, who was thirty-six years older than Vesalius, and who survived him thirteen years, must have known all the Vesalian family connected with the courts of the Emperors Charles and Philip—the grandfather, John Vesalius, and the father, Andrew. He, therefore, would know our Andrew all through his short and brilliant career. It seems also to be generally accepted that the plates came from the studio of Titian. Lastly, they are in every way worthy the hand of that master.

Horatio, the versatile youngest son of Titian, who from painter, all but equal to his sire, was charmed away from art by the Philosopher's Stone, has been accredited with the honour of being the delineator for Vesalius. A brother of Titian, who after kindling jealousy in the heart of the master toned down to an ebony carver, has received the same honour. Lastly, to John Stephan de Calcar, whose portrait of Vesalius is one of the treasures of the Royal College of Physicians, who was so matchless a pupil of Titian that the works of master and pupil are apt to be confounded, and who certainly drew the *Tabulæ Anatomicae*, because his name is on them, has been assigned the distinction. On the whole, the evidence is in favour of the view that John Stephan was the designer and perhaps engraver. He was the friend of Vesalius, and, like the ancestors of the anatomist, born in the Duchy of Cleve, was “a Fleming,” ranking, as Vesalius describes him, “with the divine and happy wits of Italy.”

Whoever was the delineator, he was the equal, in his way, of Vesalius himself. There had been nothing before like this art in anatomy ; there has been nothing to surpass it since. Unconsciously, almost, the plates have been copied from then to our day. Old Helkiah Crookes, or Crocus, writing in London, in the year 1615, a big volume on anatomy—printed by W. Jaggard, printer of the first edition of Shakespeare's plays—sneers at Vesalius as a copyist from Galen, and then copies Vesalius from the beginning to the end of his volume. Rascally Crocus !

The plates stand any inspection. I have had them all photographed on glass, in order to throw them on the screen with the oxy-hydrogen light, magnified to the full natural size. They bear the test well. I have put them, thus enlarged, before an audience, who saw them with a wonder which Vesalius himself never enjoyed. Some listeners to my lecture told me afterwards "it was like looking at the dissected body transparent," and as far as the plates were concerned they were right.

The work altogether, indeed, may be most conveniently studied and described from the plates.

The series opens with the skeleton, each bone depicted with exquisite fidelity. The anatomist prided himself on his knowledge of the bones. Once in Paris he allowed himself to be tested. He was closely blindfolded. Then every bone of the body that could be distinguished by the touch was put into his hands, and by the sense of touch he was able to name every bone correctly, and tell its position in the skeleton—to his questioners a wonderful exhibition of knowledge and skill. Blindman's-buff with dead man's bones !

On another occasion, in 1546, at Basle, he fitted up a skeleton entire, and presented it to the authorities of the University. Above the gift was engraved the following :—

Andreas Vesalius. Bruxellen.
 Caroli v. Aug. Archiatus.
 Laudatiss. Anatomicarum.
 Administr. Comm.
 In Hac Urbe Regia
 Publicaturus
 Virile quod cernis sceleton,
 Artis et industriæ suæ
 Specimen.
 Anno Christiano
 MDXLVI.
 Exhibuit Erexitque.

The illustrations of the osseous are followed by those of the muscular system, and are equally fine. The views of the superficial layers of muscles have since been made familiar to us in almost every illustrated work on anatomy, in almost every cast in every studio. The well-known profile view, which the public usually refer to as "the man running away without his skin," is one of this group of Vesalian treasures. The views of the superficial layers of muscles are followed by the deep layers, illustrations not so agreeable to the eye, but wonderfully accurate. The different muscular organs are drawn to indicate function, as well as structure.

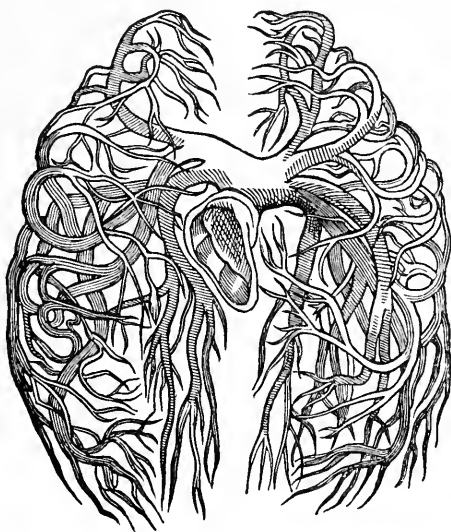


Fig. 1.

From the osseous and muscular to the respiratory and circulatory systems is another step in this wonderful gallery. The whole of the arterial system and of the venous system is delineated in separate plates, and to them is added another plate, in which the two systems of vessels, arteries and veins, run together in their natural order. In other plates follow special circulations:—the circulation of the brain; the portal circulation—a plate of surpassing character—and the pulmonary circulation in two views. In a small series of plates the anatomy of the heart is represented.

To convey to the reader who may not have the volume of Vesalius

by his side some idea of these illustrations, Bertram Richardson has copied a few of them precisely as they appear in the volume.

Fig. 1 shows the pulmonary circuit from its anterior aspect, with the heart dissected away.

Fig. 2 shows the left ventricle and its valves.

Fig. 3 shows the aorta laid open at its origin and its semilunar valves.

Fig. 4 shows the tricuspid and mitral valves when they are closed and made tense by fluid pressure from below.

From the mode in which the last drawing is carried out I have little doubt that the valves were floated up, as in the modern

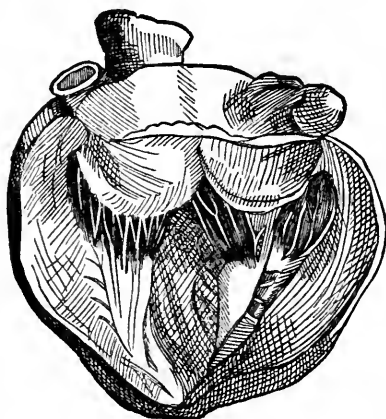


Fig. 2.

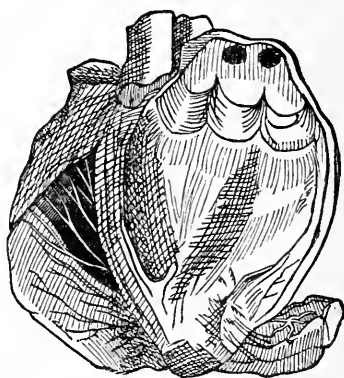


Fig. 3.

class-room experiment, by filling the ventricles with water until the valves became sufficiently raised and tense to close.

The illustrations of the nervous system equal, if they do not even surpass, those of the osseous, muscular, and circulatory. The position of the brain within the cranium; the membranes which cover the brain; the sections of the cerebral matter; the cerebral cavities; the divisions of cerebrum, cerebellum, and medulla; the base of the brain; the origin of the cerebral nerves; the distribution of the nerves; the spinal cord, and the commencing ramifications of the *par vagum*, form a series or gallery which ought to be republished in full. I append one or two specimens. In Fig. 5 there is shown the Vesalian view of the base of the brain, with the origin of the cerebral nerves. It will be seen from this that

Vesalius divided the nerves into eleven pairs—the olfactory, the optic, the *motores oculorum*, the trochlear, the trifacial, the abducens, the *portio dura*, the *portio mollis*, the glosso-pharyngeal, the pneumogastric, and the spinal accessory.

According to our modern reading of parts, the most defective exposition in this drawing is in the origin of the nerves from the medulla. The columns of the medulla are also wanting in definition.

In another drawing we have brought before us the profile or side view of the brain. In this work the proportions are admirably preserved, and the distributions of the nerve trunks are faithfully followed. The divisions of the trifacial are executed with the

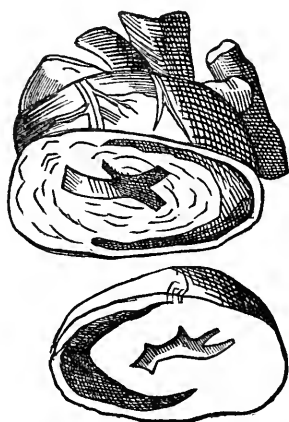


Fig. 4.

utmost care, and the large descending *par vagum* is boldly outlined.

Connected with the nervous system, the organs of the senses are not forgotten, but they are, it must be confessed, less perfectly depicted. The eye is the only organ of sense freely illustrated, and that not, in all cases, correctly. The crystalline lens is placed too far back, and the drawing of other parts is hard. The iris copied in Fig. 6 is an exception; it is better drawn. The construction of the organ of hearing is not illustrated connectedly, but the three bones of the middle ear, the malleus, incus, and stapes, as will be seen in Fig. 7, are fairly portrayed.

The structures which form the vocal organs are rendered with

considerable care, and one view of the larynx and windpipe (Fig. 8), showing the branching off from the pneumogastric and the return of the left recurrent laryngeal nerve, is a fine study. In Figs. 9 and 10 two views of the larynx are copied.

To the parts and organs concerned in the process of digestion Vesalius paid the closest attention, and his large views of the whole

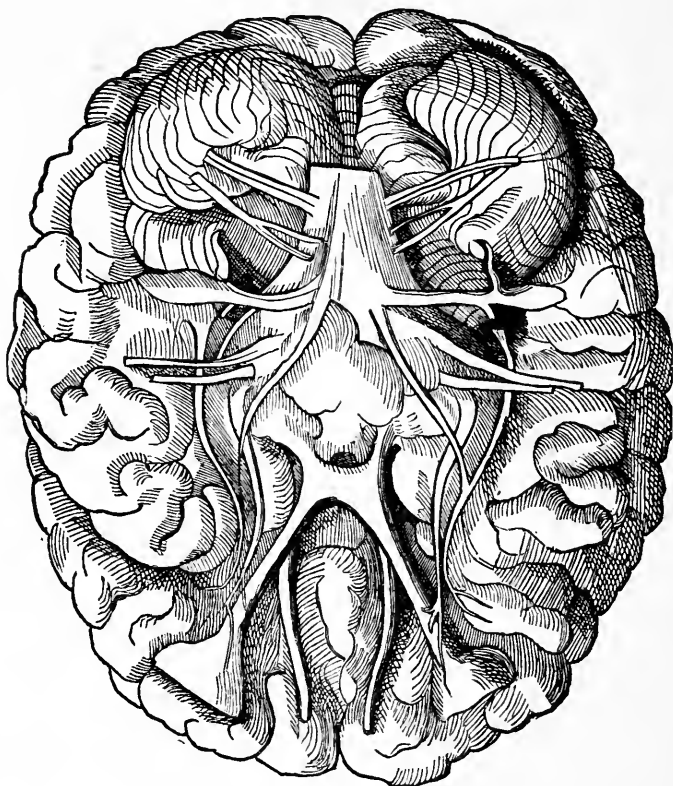


Fig. 5.

of the alimentary system are worthy of an anatomist of to-day. In Fig. 11 there is presented his view of the stomach, in which he depicts the three coats—the external coat of peritoneum (A A); the two layers of muscular or fleshy fibres (B B); and the inner or lining coat (c).

In other drawings he delineates the stomach turned inside out ;

the different parts of the intestinal canal ; the opening of the bile duct and pancreatic duct into the duodenum ; the mesentery ; and the spleen.

The organs of generation, the kidneys, the bladder, the liver, are also illustrated, the kidneys less effectively than the other parts. The lacteal system and the absorbent system generally, is lacking ; for although Galen was conversant with some of the lymphatics, thinking them to be parts of the circulation ; although Fallopius had seen lymphatic vessels in the liver ; and although Eustachius had discovered the thoracic duct, Aselli, Jolliffe, Bartholin, and Rudbeck had to appear before the anatomy of the lacteal and lymphatic vessels was added to the common store of scientific learning.

I have spoken thus far of the dissections and plates of this famous book, and there is little need to say much more. The dissections and plates are the book. The text is plain, concise,

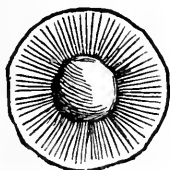


Fig. 6.



Fig. 7.

and common sense, but is not peculiarly attractive nor great. It describes what has to be described well, but it is not inspired with new thought. The strangest indeed of all facts in the text is the one fact that its author could have disclosed so much and not discovered more. The whole mechanism of the circulation, for example, is laid bare by his hand, and yet he knew nothing of the circulation. Heart, arteries, veins, valves—he dissected them all, but to him they were dead. He saw the heart but not the circulation. It required the genius of Harvey to see and describe the *De Motu Cordis et Sanguinis*, and yet, perchance, Harvey had never seen the motion had Vesalius not traversed the circuit.

The fame of the great book soon spread far and wide. It was republished in Germany, in Holland, in England, translated from the original. In England three editions of an epitome of it followed each other from one man, Thomas Geminus, or Gemini. The

first edition of Geminus was published in Latin, in 1545, in London, under the title *Compendiosa Totius Anatomie Delineatio, ære*

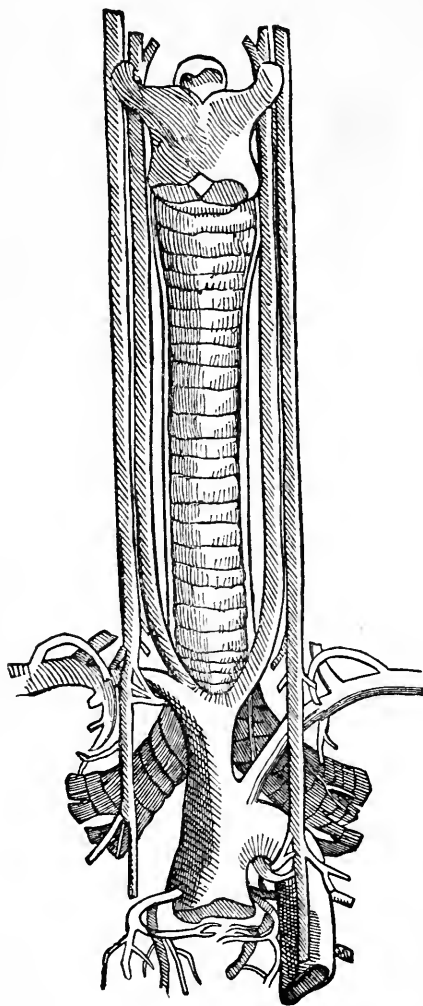


Fig. 8.

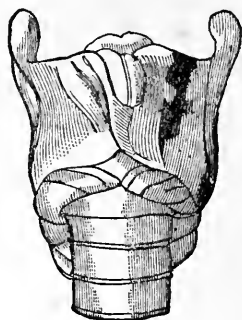


Fig. 9.

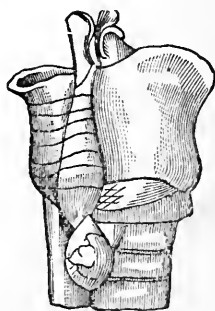


Fig. 10.

exarata. It is dedicated to Henry VIII., and contains the Vesalian plates well executed. The work is believed to be the earliest

anatomical treatise published in England, and the first in which the roller printing process was employed.

In 1553 Geminus published the second edition, in which the letterpress is translated into English. This copy is dedicated to the then King, Edward VI., with a commendatory note as follows:—

“To the gentill readers and Surgeons of Englande, Nicolas Udall in the Lorde gretyng with encrease of good knowelage.”

The volume was “imprynted at London by Nycholas Hyll, dwellynge in Saynte John’s Strete, for Thomas Geminus.”

In 1559 Geminus published a third edition (in English), dedicated this time to the most high and virtuous Princess, Queen Elizabeth. This copy is believed to contain the first published likeness of the

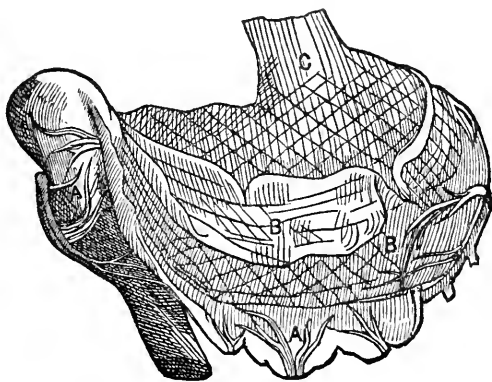


Fig. 11.

Queen, and, sooth to say, it does not flatter her. She is presented in the centre of an illustrated title-page, and, by the strangest of coincidences, above the Queen, enthroned in a kind of temple, sits another Queenly figure, with a pen in her right hand, a wreath on her left, and her foot upon the great globe, and styled “Victoria.”

Oh, Gemini ! hadst thou prophetic virtues ?

This third edition was imprinted at London, within the “blackefryars,” by Thomas Geminus himself, “Anno Salutis 1559, Mense Septemb.” A royal copy of this edition is in the British Museum, with the Vesalian plates complete, although some ignoramus has touched them over with a coat of red colour, to the serious detriment of the delineations of the brain.

In these two last editions Thomas Geminus seems to me to have

rather imposed on his readers by making the volumes too much like his own productions, and too little like those of Vesalius.

Later in history, 1725, Boerhaave and Albinus republished in Latin the *Opera Omnia* of Andrew Vesalius, with the anatomical drawings illustrated in perfection of style, and with a noble preface, containing the life of the anatomist. Of all the editions of Vesalian labour since Vesalius, I like this by far the best, and recommend the classical Æsculapian never to miss the opportunity of adding it to his library.

EPITOME DE HUMANI CORPORIS FABRICA.

In the same year as that in which the great book was issued, there was published by Vesalius an epitome of it, dedicated to the Prince Philip, and illustrated. This also was published at Basle "Mense Junio, 1543," printed on vellum, with the same frontispiece as that which accompanied the plates, and with the addition of the likeness of Vesalius by John Stephan de Calcar. The accompanying likeness is reproduced, by the autotype process, from that in the vellum edition of the original work of 1543 in the British Museum. It presents Vesalius in his twenty-eighth year, probably in professorial costume, and engaged in dissection of the muscles of the fore-arm. The vellum edition of the epitome in the British Museum is a rare book, and is in splendid preservation. It is believed to be the copy sold at the sale of Dr. Richard Mead for £8 12s. 6d. There is a similar copy in the University of Louvain. The likeness of Vesalius has never before been reproduced by autotype, and I think I may say never before so faithfully, as in the plate now presented to the readers of this essay. It does not flatter, but it is more characteristic of the anatomist than the better-known copies of the portrait in oil, by the same artist, in the possession of the Royal College of Physicians, or of that in the Hunterian Museum, at Glasgow, which has been ascribed to Titian.

Three or four minor works of Vesalius have been added to the great work, and after his death, a pupil of his, Prosper Borgarucci, published a digest of a Vesalian treatise on surgery, entitled *Chirurgia Magna in Septem Libros Digesta*. I need not dwell on these productions, which, as mere offshoots of a great mind, do not add to the glory of its mission. Better is it to follow to the end the career of the master, and depict his departure *ex hac turbâ et colluvione*.

One word, however, before leaving the works, bearing upon the conscientious care of the worker. The *De Humani*, as well as the *Epitome*, was printed, as we have seen, by the learned John Oporinus of Basle. To Oporinus Vesalius wrote a letter, dated September 9th, 1542, in which his scrupulous care for correctness is well displayed. He advises Oporinus that the woodcuts of the work have left Venice for Basle. He begs him to take the greatest care that the printing of the illustrations shall correspond, in the fullest degree, with the artist's proofs which accompany the blocks. "Every detail must be distinctly visible, so that each cut may have the effect of a picture." He complains of the rough plagiarisms of his plates, and explains that the woodcuts now sent were done at his own expense to ensure accuracy.

THE COURT PHYSICIAN.

Charles V. of Spain—father of that Philip who came to England, and married our most unhappy of English queens, Mary—called the anatomist to his court, as Archiatus, in 1554. In the following year, Charles abdicating in favour of Philip, the office was continued to him by the new emperor, who, wicked, false, and treacherous as he was by nature, played fast and fair with the Archiatus.

In 1559 Vesalius was sent, by Philip, to France to attend Henry II., who, in the midst of the marriage revels connected with the espousals of his daughter Elizabeth with Philip, and his sister Margaret with the Duke of Savoy, had run a tilt in a tournament with the Count Montgomery, and received the shaft of the Count's broken lance in his right eye. Vesalius accepted the mission, but was too late to render service. On his arrival at the French court the king was dead.

In 1560 Vesalius followed Philip to Spain, and Don Carlos, son of the Emperor, having received an injury on the head, was treated by him, and, as the word went, was "cured." The credit of the "cure" capped the fame of the anatomist, and the curer became fashionable as well as famous. Another event, which Thuanus, a trustworthy historian, records with much admiration, added to the notoriety. Maximilian d'Egmont, Count of Buren, a general and a favourite of the Emperor, lay ill. Vesalius, as physician in attendance, pronounced the illness fatal, and predicted that life would not continue beyond a certain day and hour. The Count, accepting the prediction as true, invited all his friends to a grand feast immediately preceding the fatal moment. After the banquet he made presents to

his guests, bade them an everlasting farewell, and, like a true and obedient patient, expired at the very moment Vesalius named as the time for the prescribed exit. Vesalius probably was not the first, and he certainly was not the last physician who has gained credit by such *sors prospera*.

"Let him that thinketh he standeth take heed lest he fall." The Archiater, at one moment in the zenith of his living eminence, was stricken the next, as by a mortal blow, to see the cloudless vision of life no more.

THE PILGRIM.

In the early spring of the year 1562, Vesalius left the court at Madrid in a mysterious way, or, more correctly said, for a mysterious reason, which has never been clearly explained. He was famous, a court favourite, and so rich that it is asserted he lent considerable sums of money to several young and noble Spanish spendthrifts at a high rate of interest, on the condition that they would repay him when he should return. He travelled to Venice by Perpignan, but was delayed by litigation at the Spanish customs house, owing to his determination to save a small bribe, which cost him in the end a fortnight's detention and fifty crowns.

From Venice he started to Cyprus in company with General Jacobo Malatesta, the commander of the Venetian forces in that island. From Cyprus he then passed to Jerusalem on pilgrimage to the Holy Land, like one, it is assumed, who had lost caste, for a time at least, if not for good, and who was expiating some great offence. What is the mystery?

Five speculations have been advanced in explanation. Swertius, thought an authority, lays it all on Signora Vesalius, a querulous and imperious woman, who made home so insupportable that her husband resolved to escape on the pretext of fervour for pilgrimage.

Joannes Imperialis, another authority, assigns as the motive the desire to be free from the anger of the members of the Galenic school, and the fear that they would undermine him with the Emperor and cause him to be dismissed from court.

A third explanation is that, as the Archiater tasted riches, he grew more and more in love with them, and that to add to his wealth, he visited Palestine.

A fourth idea is that during a long illness he vowed to do a pilgrimage should he recover.

The last hypothesis, the most probable and the most accredited,

is supplied by Hubertus Languetus—Hubert Languer—a tragic exposition thus expounded :—“Vesalius, believing a young Spanish nobleman whom he attended to be dead, obtained leave of the parents to open the body for the sake of inquiring into the cause of the illness, which he had not rightly comprehended. This was granted ; but he had no sooner made an incision into the body than he perceived the symptoms of life, and opening the breast, saw the heart beat. The parents coming afterwards to the knowledge of this, were not satisfied with prosecuting him for murder, but accused him to the Inquisition of impiety, in hopes that he would be punished with greater rigour by the judges of that tribunal than by those of the common law. But the King of Spain interposed, and saved him on condition that by way of atoning for the error he should undertake a pilgrimage to the Holy Land.”

Jacobus Magnetus gives credence to this explanation. Boerhaave and Albinus think it possibly true. If it be true, Vesalius failed to diagnose catalepsy from death, a pardonable error in his day, perhaps pardonable even now in extreme examples of that disease.

On the 9th October, 1562, the pupil of Vesalius, the brilliant Fallopius, only forty-one years of age, died at Padua, leaving vacant the first chair of physic in that wonderful school of medicine. A worthy successor it was hard to find, and at length, in 1563, the electors, the Senate of Venice, sent after the wandering Andrew Vesalius, still on the pilgrimage business, to return to Padua and assume the vacant chair. He received the message at Jerusalem, and in the autumn of the following year set sail, probably from Joppa, for Italy. The voyage was unfortunate. A violent storm drove the vessel upon the Ionian Islands, and wrecked it on, or near, the island of Zante, on which island, stricken with cold and hunger, the great anatomist—Archiatus probably no longer—yielded up his breath, upon the 15th October, 1564, six months, less eight days, after the birth of our Shakespeare, and fourteen years before the birth of our Harvey.

A friendly goldsmith of Venice, recognising the body of Vesalius, gave it modest burial in the Church of Our Lady in Zante, and inscribed over the tomb :

ANDRÆ VESALII BRUXELLENSIS TUMULUS,
QUI OBIT IDIBUS OCTOBRIIS,
ANNO MDLXIV.
ÆTATIS VERO SUÆ QUINQUAGESIMO
QUUM HIEROSOLYMIS REDIISET.

This is the history generally accepted of the last days of the Father of Anatomy. There is another story, that he died from sheer avarice ; that he refused to provide himself with sufficient food for his voyage, was too proud to beg, and although relieved by a friendly German fellow passenger, underwent such starvation that on reaching Zante he succumbed from long fasting and cold. Had this story, or other such stories against him, been true, the Church would not, I think, have been his friend, for it never loved the scientific scholar. Yet after his death the Capuchins, occupying a house in the High Street of Brussels, on the site of which house Vesalius had lived, dated their letters, *Ex ædibus Vesalianis*.

In Andrew Vesalius, industry, courage, and skill in exposition were the living attributes which gave him power in his own time, and enduring power after his own time. His mind, the purest analytical, was fitted strangely to unravel and expose natural secrets, but was poor in constructive or synthetic quality, and, therefore, weak in discovery of the natural principles or designs relating to the parts of natural objects ; the mind of an anatomist as distinguished from a physiologist, the logos left out altogether. Intense, proud, and perhaps avaricious both of fame and wealth, he was borne on, nevertheless, by a magnificent impulse towards, and to, as magnificent a fame as ever befell a soul of science of any age or race.

Hermann Boerhaave, M.D., and the Origin of Scientific Medicine

“**S**IMPLEX sigillum veri,” was the motto of the master in physic whose name heads this memoir. It lasted him through a fairly long life, through all reports, good and bad. It was engraved on his tomb.

Whatever work of this master we take up now to read, whatever division of the work, we find in it the spirit of that famous impression. He wrote so clearly that every one could understand him. In the robe of the professor he delivered the teachings of the simplest student. He never shrank from the art of letting himself descend as a teacher to the intellectual level of the taught. For was it not his first principle, *Simplex sigillum veri*?

The firm adhesion to this principle caused the name of this master to be the most widely known and admired of all of his age amongst the masses of the people; the most detested and hated amongst the few jealous pedants who looked on, and were obliged to recognise his popularity. The tradition that a letter addressed to him from the Celestial Empire, and bearing as its superscription the magic words, “Boerhaave, in Europe,” found him without difficulty, is evidence of his popularity in the world at large. Once, as he began to recover from a severe attack of gout, he found, when he made his first appearance in the city in which he dwelt, the whole place *en fête*; the bells were ringing merry peals, the houses were decorated, the streets were brightly illuminated. It was all because he, Boerhaave, had returned to health and labour.

These were triumphs, but they were not without their reverses. His views and character, so admired by the many, were assailed with uncompromising anger and bitterness by the not many, who, as is so common under such circumstances, charged him with being what he

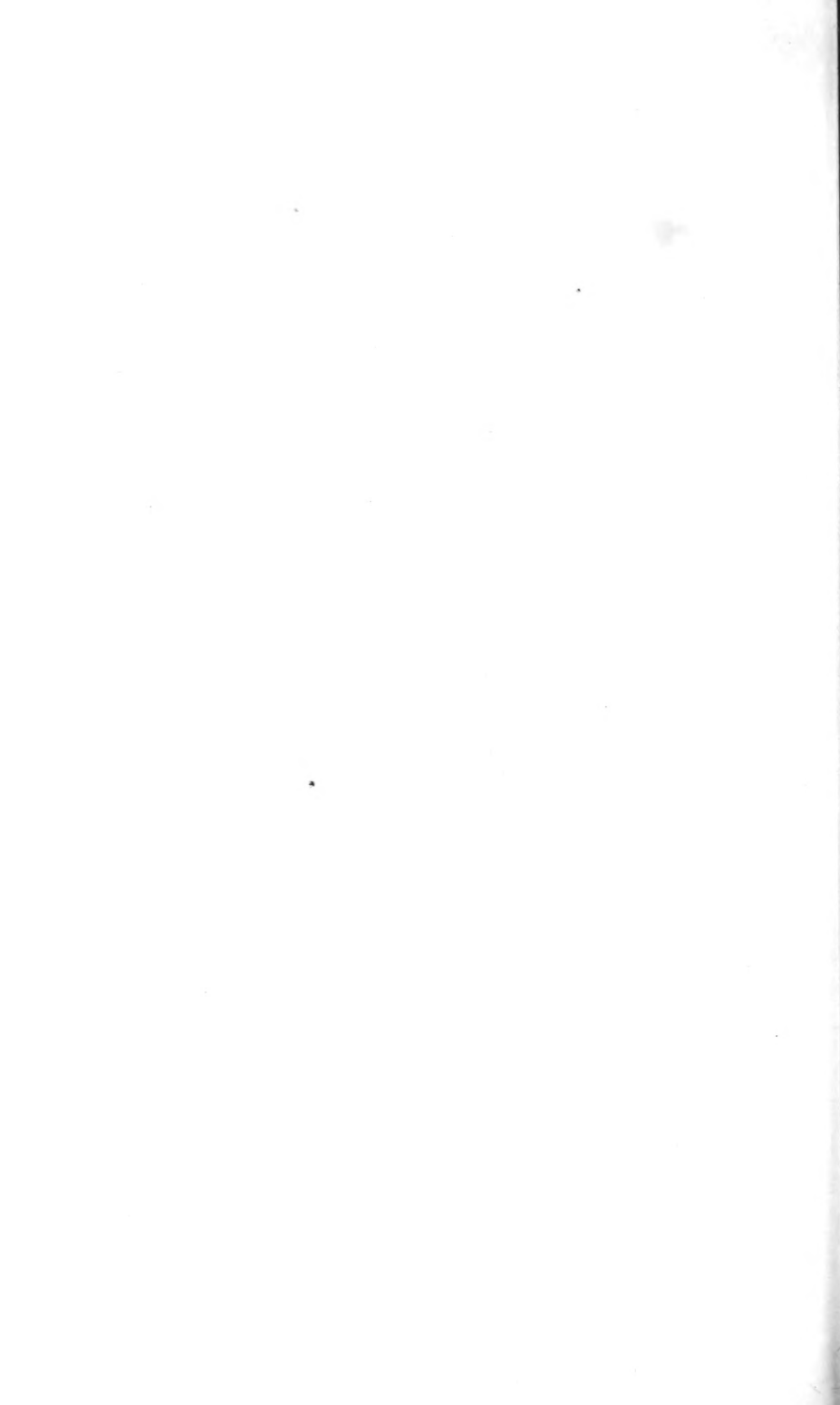
was not, and of not being what he was. Fortunately for him, he was blessed with so happy a disposition, that he could let the detractors have their own way and roll in their own impurity as freely as they pleased. He held by the text, *Simplex sigillum veri*, and for his detractors he added another text which he held by with equal tenacity,—“The sparks of calumny are presently extinct of themselves, unless you blow them.” A proverb of proverbs. In him an intense zeal lived in concert with a dispassionate judgment, the two hands of nature herself, heat and cold.

Voorhout, a little village two miles from Leyden, had the honour of being the birthplace of Hermann Boerhaave, on the last day of the year 1668. His father, a minister of the Church of the Evangelist, was poor of means as he was pure of spirit. Hermann was the firstborn of his family, and with natural sentiment his father planned for him that he should enter the ministry, and for his early education in this direction acted himself as tutor. Hermann, as many incidental references in his life show, was, as a child, favourable to the calling; but while still in his twelfth year, he fell sick, and suffered on his left thigh from an ulcer, which was slow to heal. The pain from the open sore was extreme, and interrupted his studies, until he began, it is said on his own account, to treat the sore with a solution of salt and wine, essentially the old antiseptic “brandy-and-salt” treatment, which some half-century ago from this time was revived with much fervour. The treatment was successful, and under it the ulcer healed. From this effort to be a healer, the mind of the boy was turned to healing as an art or science.

Continuing his studies after his recovery, still under his father's supervision, he reached, in 1682, his fourteenth year, when he went to the public school of Leyden, ran rapidly up to the sixth or highest form, and within eighteen months, including six months' probation, was admitted into the University of Leyden. The important event was marred by yet another, to him more important, the death of the good minister his father. There were, at this juncture, in the Boerhaave family circle our scholar, Hermann, one brother, James, seven sisters, and the widowed mother, all of whom had to be maintained on a provision very small indeed. Friends rose up. Professor Trigland, one of the Professors of Divinity, and no doubt a friend of the dead minister, took the young Hermann by the hand and brought him into contact with the Burgomaster of Leyden, Daniel van Alphen, and, under their advice and protection, he spent his academic life in the university, a many-gifted student, not



HERMANN BOERHAAVE, M.D.



singularly great in any one department of learning, but good in all, and industrious beyond common comparison. Thus, as one of his French admirers and biographers says of him, "Boerhaave devint très versé dans l'hébreu, le chaldéen, l'histoire ancienne et moderne, même l'histoire ecclésiastique, et ce qui lui fut plus utile, la philosophie et les mathématiques."

In his nineteenth year our student made his first public appearance as a writer, or it may, perhaps, be more correctly said, as an orator. In 1689 he delivered, under the presidency of Jacob Gronovius, the famous professor of Greek, an oration on *Cicero and the Epicurean Philosophy*, for which, as a probationary exercise, he received the gold medal of the university. This essay he does not himself include in the list of his published works; on the contrary, he excludes it by not naming it. It was probably, therefore, only privately published, although it long remained in the memories of those who heard it. It was an effort to prove that Cicero was well acquainted with, and confuted, the doctrine of Epicurus on the chief good.

Up to this period of his life, Boerhaave, except for the boyish predilection for medicine already noticed, had continued in preparation for the ministry according to the wish of his father; while the younger brother, James, was intending to prepare systematically for a medical career. Of these facts there can be no doubt, because Boerhaave himself records them. In the preface to his great work on chemistry, published in 1734-5, towards the close of his life, Hermann, in dedicating the book to James, speaks of those early days of theirs, when both were students with destinies undetermined. "At that time," he reminds James, "your thoughts were turned chiefly to physic, mine to divinity. But Providence ordered otherwise, so that, altering your designs, you devoted yourself entirely to sacred things, making it your whole concern to promote the true worship of God by the plainness of your teaching and the integrity of your life; whilst I, conscious of my weaker abilities, and not daring to attempt anything higher, was content to apply myself to the study of the healing art."

How this change of career was brought about in this student, and afterwards master of the art of healing, is a curious and interesting episode connected with his early life. His mind, as he has told us above, was set on divinity. To the study of theology he, therefore, devoted himself, in order to prepare for the usual examination and declaration required for the ministerial function. Being poor, however, he undertook to teach mathematics, in order to obtain

the means to live and pay for his instruction. He succeeded as a teacher, and soon became famous as a scholar, writing, as such, a dissertation on the distinction of the mind from the body, which, though not acknowledged afterwards as a published work, attracted fame when it was first written. The public library of Leyden had bought from England some Vossian manuscripts, and it was necessary to compare these with the sale catalogue of them. Boerhaave was entrusted with this work, and did it so well that he became much admired in the university, and increased greatly the friendship of Vandenburg, a man of good discernment, who advised him to study physic as well as divinity. The advice taken, the great medical authors, Vesalius, Bartholinus, Fallopius, Hippocrates, Sydenham, Harvey, became his teachers. Next he turned to chemistry, and from that to botany, to which last-named science he lent himself, then and ever afterwards, with incessant zeal. He also studied anatomy from dissections under the direction of Professor Nuck, and in July 1693 he went to the University of Harderwick, and there took out a degree of doctor of physic, writing as his thesis on the practical subject of observing the excretions during periods of disease, *Disputatio de utilitate explorandum excrementorum in ægris ut signorum*.

Still his intention was for the ministry, until there occurred the episode to which reference has, incidentally, been made.

At the time when this occurred, the theological world was wild on the doctrines of the learned and outspoken Jew, Benedict Spinoza, who in 1670 had published, in Amsterdam, his *Tractatus Theologico-Politicus* and who, dying in 1677, had left behind him three remarkable memories, a stoical practice of living, a resolute death, and a set of posthumous writings, afterwards published as the *Opera Posthuma* in which the heresy of the heretic was put forth with unconcealed freedom. Spinoza, in these days, would hardly be called a heretic. He would be considered in life and doctrine as a modern Stoic. He taught anew what had been taught of old, that God is everywhere. As Cato says :—

“ Estne Dei sedes nisi terra, et pontus et ær
 Et cœlum et virtus? Superos quid quærimus ultra?
 Jupiter est quodcunque vides, quocunque moveris.”
 Where is the seat of God, unless it be
 The earth, the air, the sea?
 Where is the seat of God, unless it be
 Virtue and Heaven? What further need we know?
 Jove is whate'er we see, where'er we go.

But Spinoza, in his day, was heretic to Catholic and Protestant alike ; and he who breathed his name admiringly, or even apologetically, was branded Spinozist, a bad name which our Boerhaave, in the following manner, got accredited with.

In a passage boat, or packet, in which Boerhaave was sailing, the passengers were discussing Spinoza. One more loudly than the rest condemned the great Jew in no measured terms, whereupon Boerhaave put in the pointed question, whether the declaimer had ever read the works he so outrageously criticised ? "The orator," it is said, "was at once struck dumb and fired with silent resentment." Then some other passenger, having learned Boerhaave's name, wrote it in a book, and when the would-be minister of religion arrived at Leyden, he found himself a Spinozist. He had now two goals before him, the pulpit or the medical professor's chair. If he tried for the pulpit, such was the clamour against him, that he, son of the honoured orthodox divine, might be refused the licence. That goal was, therefore, clouded ; the other was clear before him. The choice was as sound for his own future fame as it was beneficial for the great world of thought, which it was, henceforth, his duty and pleasure to serve and illuminate. The choice was medicine.

The goal determined on, Boerhaave moved steadily along his selected way. He accepted the office of lecturer on the Institutes of Medicine, with Professor Drelincourt as his titular superior, a splendid chair in which medicine as a practice was based on medicine as a science, physiology with practice hemmed to it. In 1701 he opened his course with an oration on the works of Hippocrates. It was an eloquent vindication of that natural method of study which the Father of Physic so splendidly set forth, and which the iatro-mathematicians, or mechanical theorists, had just previously so widely departed from and ignored. The oration was delivered on the 18th of May, 1701, and was the foundation of Boerhaave's future celebrity as a professor, practitioner, and natural philosopher. In that effort he foreshadowed the greatness of the name of Boerhaave in Europe.

Fortunately, the happy reception he had met with in his first attempts tied him to his native city for his life's work. In 1703 he was tempted to accept a professor's chair in the University of Gröningen. He declined, and remained faithful to Leyden, adding practice to professional teaching. The result, in respect to practice, was good, for Leyden was then a centre of great wealth, and the patients of Boerhaave rewarded him for his services with no mean

hands. To him the rich flocked and paid their fees as freely as their admirations. "Princes, kings, nay emperors themselves," says one of his biographers, came to consult him; and one wealthy Englishman presented him with a beautiful and commodious country house in return for some simple, but efficacious, piece of advice on the art of rowing a boat in such a manner as to combine healthy exercise with an oarsman's skill.

From his starting-point onwards and onwards, through the history of thirty-seven years, our Boerhaave continued his course with honours and duties increasing upon him, yet not without some alloys, which to many men had been fatal. He became great as a teacher, with students from all parts of the world crowding his lecture room. He became so great as a writer that one at least of his works was translated into an Oriental tongue, and circulated, with idiomatic expositions, through the Ottoman empire. He became great as a botanist, and so enriched the physic garden of his university with new plants that it had to be enlarged to double its original size. He became great as a chemist, and, indeed, so great that his influence on organic chemistry remains unto the present hour. He became famous as an orator, treating fearlessly on metaphysical and crucial subtleties, on which the mind of man is ever violently tossed and vehemently shaken. And, if he did not become great, he became famous as a physician, which is perhaps as much as can be said of any man on that side, seeing that favour in practical physic fluctuates with the tastes of the time in which it flourishes, and in like manner vanishes.

To all these distinctions he added goodness, sweetness of soul, simplicity of life in the lap of luxury, gentleness in the storm of persecution, versatility in the midst of industry, poetic sentiment less poetic rhythm. His light was as that of the lamp before the altar, always burning, never flaming high; a guiding light steady as that of a polar star.

The accompanying portrait of Boerhaave, autotyped from G. White's engraving in the British Museum, gives us the man just at his prime. He looks like our Oliver Goldsmith more than any other man of history I can at this moment remember. A broad Saxon face, with features large and fine, except the nose, which, with Teutonic obstinacy, will turn upwards, to the decided injury of the beauty of the profile, when comparison is made with another portrait. The head is massive, the forehead broad and prominent, the eye full, the ear with a big lobe, the lips well developed, and the cheek bones

rounded and expansive, but flattened. The expression is not commanding, but good-tempered, determined close up to obstinacy, and wanting altogether both in Semitic subtlety and Keltic fire. In fine, the face of a pure Saxon, coming up as near to genius as any pure Saxon can come by the forces of intense study, varied application, and incessant indomitable industry.

That a man so constituted would say and write many things that went against the prejudices of others, without himself foreseeing the effect, were a moral certainty and a natural fate. But whatever harm might spring from this course was compensated for by the trust he had in his own industry, and by the entire absence of resentment which held him placid and unmoved through all those wild controversies which, like storms and hurricanes, never destined to last long, so often waste their fury harmlessly if they are not counterblasted, and when they have cleared the air leave those they have attacked in greater force than ever.

How calmly Boerhaave accepted the severest trials of calumny was well instanced in 1715, the year of his zenith in living fame. He was at that period forty-seven years of age. He had succeeded to the full professorship of medicine over five years, having been elected professor in 1709; and now, in 1714-15, he had received the highest honour his university could bestow by being elected Rector of the university. The election necessitated the delivery of a rectorial address, which was published in 1715. The oration was a defence of the line of research in science by experiment. It expressed boldly that man has nothing to do with the question of origins of things, but has all to do with the question of the working of things which have arisen. Thus he was led to attack, without offence but with striking power, the philosophy of Descartes and of the Cartesian school. Thereupon M. Andala, a professor of divinity and philosophy at Franeker, and an ardent Cartesian, opened fire upon the Leyden professor with a fury that deafened even himself. The Church was declared to be in danger, scepticism rampant, Spinoza dominant. Through the storm Boerhaave sailed most serenely of all men, friends or foes. The colleagues of Andala insisted that he should retract the aspersions and innuendoes which he had so freely put forth, and succeeded in getting him to recant, with further promises of reconciliatory expressions. The retractation, sent by its author to the slandered Boerhaave, called from him the simple and gracious reply, that the pleasure of the reception was enhanced by the knowledge that the learned professor of divinity would have no

more trouble on his account. A man so happily constituted, "born of a happy disposition," as Joseph Priestley was wont to say, could live through anything.

To these natural qualities of mind Boerhaave added habits which were alike conservative against failure. He was frugal, and, therefore, wealthy; industrious, and, therefore, learned; versatile, and, therefore, happy; privately liberal, and, therefore, careless about the false charges of parsimony raised against him. To him the outside world was of little moment; his garden, his study, his laboratory were the three worlds in which he lived, moved, and had his being; nor is it possible to find any other worlds in this life more delightful. I, at all events, know of none, and specially envy him his garden, which of the three worlds is the one I have all my life most longed for, and never possessed.

To these three resorts of mind Boerhaave added some resource derived from music. This could not, I think, have been very high, seeing that his selected instrument for personal performance in the musical line stopped at the flute.

We know Hermann Boerhaave now from the pencil of the artist. We have some fair idea of him from the pens of the biographers. We can, in truth, visit him in his old city of wealth and learning and industry and commerce. We can depict him coming in, in the morning, from that country seat which the rich Englishman gave to him for a lesson in rowing. We can follow him in his round of visits on the sick; go with him to the university to meet his troops of disciples; see him put on his professional robe, and with the dignity of office common to those days, take the professor's chair; hear him lecture on the Institutes of Medicine, or attend his clinique, or listen to him while expounding the principles of organic chemistry or the nature and classes of plants. We can move with him from the lecture room to the laboratory, furnished with its, to us, quaint apparatus, by the use of which such as he literally struggled into knowledge, inventing apparatus as they went on. We can sit down with him in his town mansion to the richly served but frugal midday meal, in such a room as Jan Steen loved to paint; we can go back with him to the country house, walk with him round his garden, enjoy his descriptions of the latest tropical productions with which he has become enriched; enter with him to his simple supper with wife and children, and may be Brother James the minister, whose whole concern is "to promote the true worship of God by the plainness of his preaching and the integrity of his life"; be treated,

happily, to an exercise on the flute from the great professor himself; and finally, directed by his gentle hospitality to repose, hear his good-night, and sink into sleep to dream of him as in this dream.

From the date of his Rectorship of the University of Leyden, 1714, Boerhaave lived on until 1738, with apparently but two important changes in his career. In 1715 he was elected to fill the chair of practical or clinical medicine, rendered vacant by the death of Professor Bidloo, whose duties he had long supplemented; and in 1718, on the death of Professor Le Mort, he was also elected to the chair of chemistry. This last election is worthy of special note, because it led, ultimately, to the preparation and publication of the great Boerhaavian treatise on the *Elements of Chemistry* to which particular reference will soon have to be made. Through all this time he maintained good health and good spirits, for he was a man of exercise as well as thought. With his students in the country, in botanical excursions, or in quest of other fields of natural science, he drew in the breath of healthy life, and literally re-created.

All the while, too, honours came dropping in to cheer him on his way. The Academy of Sciences of France, the Royal Society of England, enrolled him amongst their illustrious, and were proud of his name.

THE WORKS OF BOERHAAVE.

"Everything else printed in my name, except a few prefaces, is spurious, and published without my knowledge," are the words written by Boerhaave in the preface to his last work, dated Leyden, July 1st, 1731. Then follows a list of fifteen works, ranged in order of time, with a brief explanation of the more important of them, and with some strange omissions, including that of the edition of Vesalius which was published in his name in conjunction with that of Albinus.

Let us devote a page or two to the study of the choicest of these accepted and always acceptable works. The first of them, the oration on Hippocrates, commending the labour of the Father of Medicine to the study of all his sons, was entitled:—

Oratio de commendando Studio Hyppocratico. Spoken and printed at Leyden, 1701. For Abrah Elsevier.

The next essay was an attempt to bring about a reconciliation between the vitalists and the mechanical philosophers in physic. The mechanical theorists, influenced by the works of Alexander Pitcairn, a Scotchman, who, during the year 1691-92, had held the

chair of physic at Leyden, and who played a notable part in his day, were usurping the place of the vital theorists. Boerhaave, too judicious and careful to be led away by either school, adopted, in the essay now under notice, what may be called a compromising criticism, by endeavouring to establish unity between the two contending sections. The effort, which from the very nature of it is not the strongest of his efforts, was entitled :—

Oratio de Usu Ratiocinii Mechanici in Medicina, 1703. For John Verbessel.

From 1701 up to 1708 Boerhaave continued to act as lecturer on medicine, and during this time composed and published the first edition of his great work, the *Institutions of Medicine*. This work, intended in the first instance for his disciples, expanded as it went on, in edition upon edition, until it became the medical textbook of Europe. It was divided into five parts, with a preliminary historical outline. The five books were respectively devoted to physiology ; pathology, including etiology and morbid changes ; semiology, under which are discussed the indications of health and disease ; hygiene, divided into prophylaxis and regimen ; and therapeutics. The Institutions or Institutes were richest in value in those parts which exhibited the erudition of their author. The last chapter on therapeutics was poor, and, as many have conceived, wanting altogether of faith in remedies. The hygiene is advanced ; but the cream of the work was the historical introduction. This has ever been a subject of admiration, and to English medical scholars is doubly precious from its noble defence of William Harvey as the discoverer of the circulation of the blood. “*Immortalis Harveius demonstrationibus suis omni priorum theoriâ eversa, novam omnino, et certam, jecit huic basin scientiæ.*” To Sydenham he pays reverence little inferior,—“The immortal Sydenham.” The Institutions are described by Boerhaave, in 1731, under the title :—

Institutiones Medicæ in Usus annuæ Exercitationis Domesticæ, 708. For John Vander Linden, Father and Son, and afterwards reprinted several times, with Additions in 8vo.

The Institutions were followed in the next year by a volume of Aphorisms. These related to matters of a medical kind, eminently practical and terse. They embraced collections of observations derived from the ancient as well as the then current learning, and were afterwards quoted on all hands by the admiring pupils of the master. Boerhaave announces them in his final work as :—

Aphorismi de Cognoscendis et Curandis Morbis in usum Doctrinæ

Domesticæ, 1709. For John Vander Linden, of which there were afterwards several editions with additions.

In the year when the Aphorisms appeared, the lecturer, Boerhaave, was raised to the rank of professor of medicine and botany in the place of Professor Drelincourt, whose duties he had so long carried out in fact, though not in rank. The promotion gave origin to another inaugural address or oration, the theme the restoration of medicine to its primitive simplicity. The essay is marked by its author as :—

Oratio quâ repurgatæ Medicinæ facilis asseritur Simplicitas, 1709. For John Vander Linden.

In the following year, 1710, he issued :—

Index Plantarum, quæ in Horto Academico Lugduno-Batavo reperiuntur, 1710. For Cornelius Boutestein, in 8vo.

I have already related that in 1714–15, upon his elevation to the Rectorship of his university, Boerhaave delivered an oration which was hotly received in some quarters. I insert here in due form, from his own words, the title of the work :—

Oratio de comparando certo in Physicis, 1715. For Peter Vander Aa.

On election to the chair of chemistry, in 1718, he delivered and issued a new inaugural address :—

Oratio de Chemia suos errores expurgante, 1718. For Peter Vander Aa.

In the next year he gave forth :—

Materia Medica et Remediorum formulæ, 1719. For Isaac Severinus.

Two years later the masterly treatise on Albinus the anatomist saw the light, as :—

Oratio de Vita, et Obitu Clarissimi Bernardi Albini, 1721. For Peter Vander Aa.

Some minor works, including *A Medicinal Treatise, De Lue Venerea*, prefixed to the *Collection of Authors upon the Venereal Diseases*, 1728. For John Arn Langera and John and Hermann Verbeck, in folio, were succeeded by two final literary and scientific labours, which have yet to be noticed, and which themselves, alone, would have left their author safe in history.

In 1730 he was for a second time elected Rector of the University, and in 1731 he resigned the chair of botany and chemistry, upon which he delivered the first of these final works and his last public discourse. As he commenced his professional utterances, so he

ended them. His last oration was one of homage to the simple Hippocratic school of medicine. It is summed up by him under the description :—

Oratio de Honore Medici Servitute, 1731. For Isaac Severinus. An Oration which he delivered when the Curators of the University honourably gave him leave to resign his Professorships of Botany and Chemistry, in 1729.

In the year 1731 there appeared the final and great work, *Elementa Chimiæ quæ anniversario labore docuit in publicis privatisque scholis*. This is the work, *Magnum Opus*, dedicated to the brother James, with surprise at the number of the labours and “the remarkable dangers which frequently attended them, and in which the brother was the faithful companion and partner.”

A review of this volume alone would, without a word in excess, call for another such an article as the present, to which I must not now be tempted. The book is a massive quarto, divided into two parts, the *Elements* and the *Practical Part*. It is hard to say which is the best. The first part, rich in history and rich in practice, is full of the most curious details. It gives, in the elementary division, a drawing of the first thermometers constructed by Fahrenheit, and of one for taking the temperatures of the human body. It describes alcohol, air, dew, fire, heat, ice, petroleum, phosphorus, water, in a way as novel for its period as valuable for its simple suggestive advancements. In the second part there is laid the whole basis of modern organic chemistry. In this part, as Dr. Thudichum, with his usual learned acumen, has pointed out, we get our first acquaintance with the substance since called urea, crystallized out “in saline globes of a particular kind that are perfectly distinct from every other salt, not foetid, not alkaline, but very evanescent, the native salt of urine.”

As I turn over the leaves of the *Practical Chemistry*, I drop by accident, at page 130, on the modern observation that compressed air prevents fermentative action, that borax is recognised as an antiseptic, and an immense number of other facts equally useful and instructive.

THE LAST DAYS OF BOERHAAVE.

After resigning his chairs of botany and chemistry, Boerhaave began to retire more determinately to his country house, and to live apart from the world. He had suffered in 1722 from arthritic

pains, probably of a gouty nature, so severely that he was confined to his bed for six months. Five years later he was again laid by, and two years later still he was obliged, from repetition of illness, to give up the active duties of life. But in his country garden he found abundant pleasures. On eight acres of garden ground he cultivated every plant he could obtain and that could be cultivated. He esteemed a present of some American plants as gifts better than gold, *munera auro cariora*, and two cedars as *regali beate dono*. But gradually his powers declined, although he attended to some private business. In 1737 he suffered from breathlessness, and in a letter which he wrote to Baron Bassand, and which is copied by Dr. Burton, to whose life of the master I am deeply indebted, he tells the story of his own impending fate. "He has an imposthumation of the lungs, which almost suffocates him on the least motion, under which, if it should continue without bursting, he must sink, and under which he may sink if it should burst; but happen what might, he was not concerned, since what could he desire that was different from the will of the Supreme Being? He was not wanting in the use of the most approved remedies, but no way anxious as to the success of them. He had lived to sixty-eight years, and always cheerful." He survived still a year, diagnosing his own case, and coming to the conclusion, from the irregular action of the heart and the unusual pulsation of the carotids on the right side, that there was dilatation of the large vessels from the heart, with polypus concretions on the right side of the heart extending towards the lungs. To the famous secretary of the Royal Society of London, Dr. Mortimer, he wrote, detailing his symptoms, on September the 8th, 1738. On September the 23rd he finally sank into the rest he did not fear.

On the tomb of Hermann Boerhaave, his beloved in life copied his beloved motto, *Simplex sigillum veri*, to which they added, *Salutifero Boerhaavii genio sacrum*, two sentences which beyond any words of any historian declare and immortalise his honoured name.

Antony Van Leeuwenhoek, F.R.S., and the Origin of Histology

EPICETETUS, descanting on those men of the historic world who bear the lights by which the world is illuminated, divided them into two classes : those who carry a torch, and those who carry a lantern. The torch-bearers are the widely-known men of their era ; their light lighteth them. Everything that they do is rendered obvious to the commonest sight. Their very features are distinctively learned off, so that they are recognisable, personally, by multitudes who have never seen them in the flesh. They are, as living men, the by-words and party words of their generation, and a few of them live, but most go out with their torches. Nay, the torch often drops with the bearer of it, before the bearer of it is dead.

The lantern-bearers, less conspicuous, retain their light, usually, to the close of the chapter, and often leave it so that it keeps aglow for others to take their light from it, and extend their radiant glory.

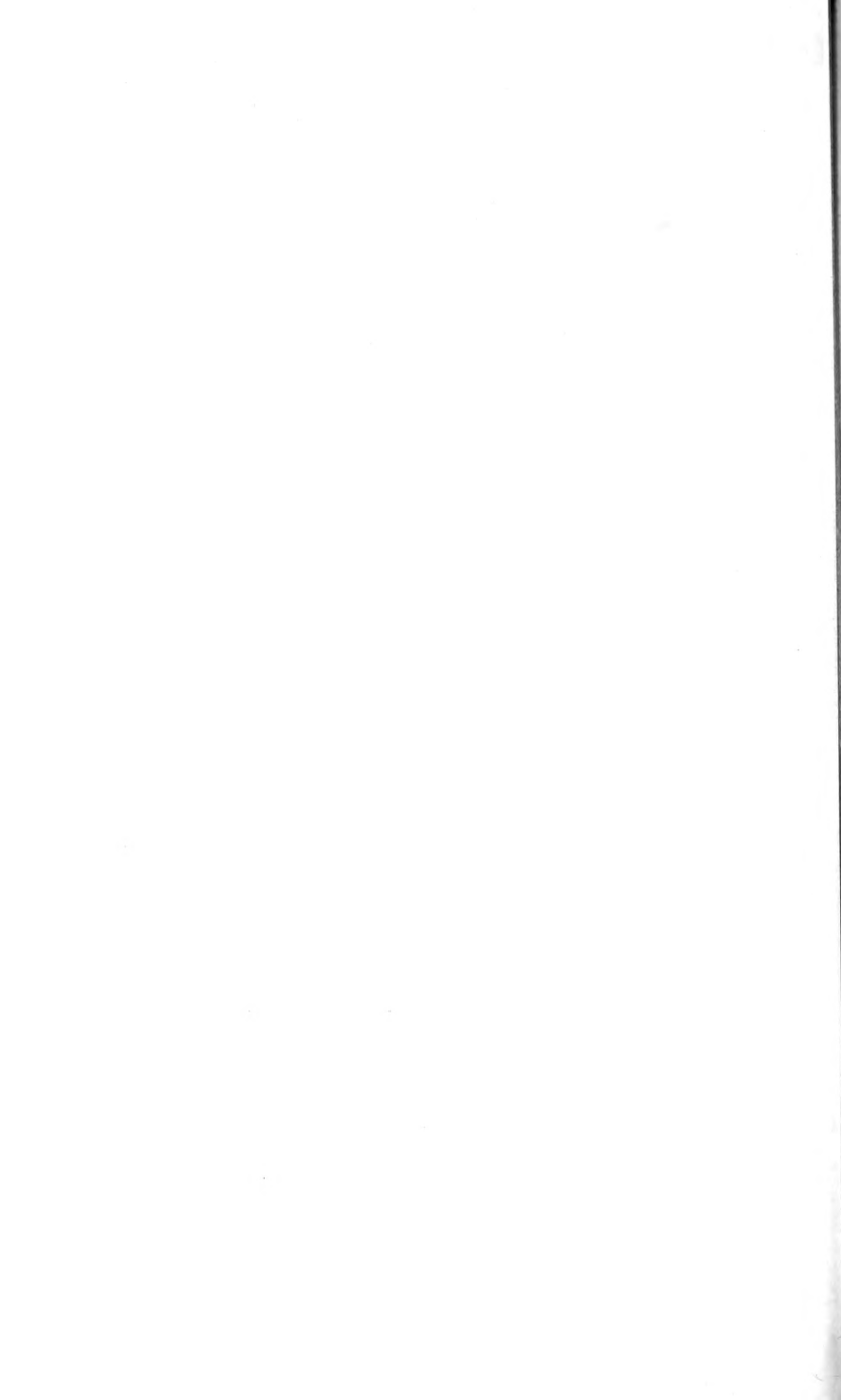
Of the lantern-bearers of science few are more representative than the great Dutchman Antony Van Leeuwenhoek, pronounced, in English fashion Leuvenhock, a man who lived ninety-one years, who worked industriously for seventy years of that period at least, carrying his lantern, a very good one, and his light, a very useful and clear one, all the while. A man of whom it cannot be said that he was either unrecognised or slighted, since the two greatest societies of the world conferred on him their honours, and one of the greatest Cæsars who ever cæsared paid him a visit in order to inspect some of his scientific work ; but who, for all that, was, personally, so little known that the biographer looks round in despair, at first sight, as he searches for material.

Antony Van Leeuwenhoek had no troops of ordinary friends, none of deadly enemies, to proclaim his fame, as William Harvey had ; no



Anton van Leeuwenhoek

A stylized signature of Anton van Leeuwenhoek, consisting of a large, flowing 'A' followed by a horizontal line and a decorative flourish.



hosts of pupils to spread his name the world over, as Boerhaave had ; no worshipping, idolatrous Boswell, to catch up all his sayings and doings, as Samuel Johnson had ; no museum to carry down the substantial record of his labours as John and William Hunter had ; no Alexander Pope to immortalise him in verse, as Arbuthnot had ; no relative to write down his history, as Aitken and Hope had ; no hand, no mind to write his own life and labour, like Goethe, Franklin, and Priestley.

Above all things, strange is it that Samuel Hoole, who collected and translated the works of Leeuwenhoek into English, reproducing within two handsome volumes the plates with which his author illustrated his papers, did not strive in his day, when there must have been persons living to whom his author was known—did not strive to collect any biographical details, but was content in that direction simply to introduce the portrait of him which is here presented.

What we know of Leeuwenhoek personally is all connected with one town in Holland, eight miles or so from Rotterdam, the town of Delft.

Between the years 1632 and 1723, the period of Leeuwenhoek's career, Delft was an ancient but flourishing commercial and military place, possessing a remarkable history. It was then, as it still remains, intersected by canals ; in its centre a market-place, like an artificial island, and over its canals a number of stone bridges, connecting the various sections of the place with the centre. In this town the people of the Low Countries cast their weapons of war—Van Tromp's cannon most likely—and kept their fighting stores ; and here, when Leeuwenhoek was twenty-two years of age, occurred the great catastrophe of the explosion of an immense powder magazine by which every house in the place was more or less injured, and many people were wounded and killed. In the Prinzen Hof of the town, in a previous time, the first William of Orange had once lived, and it was in this Hof that he was assassinated.

In this old centre of Dutchmen's wealth and power our man Antony was born on October 24th, 1632. William Harvey, then fifty-four years of age, had by this date established his discovery of the circulation of the blood ; and Gaspard Aselli, then fifty-one years of age, had made his discovery, but had not induced his cotemporaries, not even Harvey himself, as one of them, to recognise it, of the lacteal vessels and their function as carriers of the chyle. I name Leeuwenhoek thus early with these two illustrious men because, as

we shall see in the sequel, he, by another discovery, crowned their remarkable researches, and completed the discovery of the circulation.

BEDELLUS IMMORTALIS.

For the reason that Leeuwenhoek was, as a physiologist, akin to two great medical scholars, I claim for him in these pages a place amongst the illustrious who have made great the healing art, and have introduced an instauration into the science of healing. At the same time I must destroy the illusion which Wunderbeck started, to the effect that he, Leeuwenhoek, was a physician in practice at Delft. Antony Van Leeuwenhoek was neither bred to physic nor, except in the most casual and informal way, was he a practitioner of it. His own works prove this fact to the letter. Towards medicine as a practical art, and specially towards it as a practical science, he was a sceptic, and one who appears to have enjoyed many a sly joke at the expense of the faculty. Thus, at the close of his research on digestion, he apologises for having touched a medical subject. "Some," he says, "will think that I am going out of my province, but these considerations weigh very little with me, forasmuch as every judicious person knows that physicians themselves in many things proceed merely by guess, and, therefore, I assume to myself the liberty of offering my suggestions on the subject."

But although not a regular professor of medicine by an orthodox system of training, by a diploma or a degree, he was, like Stephen Hales, J. B. Reade, and the late George Lewis, learned in physic. His whole soul was absorbed in the study of natural history, and its relationship to the medical side of that history. Every line he writes bearing on this department shows that he was, for his time, a remarkable anatomist. In describing structures generally he exhibited a precision which was equal to that of any of his medical cotemporaries, and when he entered into new researches on which he had the earliest views or glimpses he stood pre-eminently first and foremost.

About his parentage, his education, his manner of making his living, we of England, and the same, I think, may be said of French and German authorities, have had nothing more than conjecture to go upon until the present date. The truly distinguished writer on Leeuwenhoek in the *Encyclopædia Britannica*—Dr. W. B. Carpenter—sustains the hypothesis that he was an optician, or a manufacturer of lenses; to which view I was attached also until,

on reading his works more carefully, I gained from them certain internal proof that the conjecture was all wrong. I was then led to the conclusion that he was occupied as a treasurer or comptroller, or as one who was engaged in some pursuit in which arithmetical labours formed a chief part. Happily now the difficulty has been set at rest by Mr. A. Wynter-Blyth, who, having while writing his book on poisons found out that Leeuwenhoek discovered the alkaloids theine and piperine, felt so much interest in him as to look up his life and career from original Dutch sources, and alighted on the truth. I am indebted to him for the following valuable epitome of the leading facts of the personal life of our philosopher :—

“Antony Van Leeuwenhoek was derived from a good Delft family, his mother being daughter of Jacob Sebastiaanzn Bel van den Bergh, who, in 1608, was a member of the municipality, and, in 1610, was sheriff. Through this family he was related to the Hogenboeks, Bleiswijks, Swalmius, and Malthenesses. His grandfather and great-grandfather were Delft brewers, and his grandmother a brewer's daughter. They were probably rich, and, as the Dutch poet, Jacob van der Does, has it,

‘Their pillows through malt were stuffed with gold.’

“On the death of Philip Antony Van Leeuwenhoek, his father, his mother, who was left with the young Antony and his three sisters, Margaret, Gertrude, and Catherine, sent the little boy to a school at Warmond, from whence he was transferred to Benthuisen, under the care of an uncle, who held an official appointment at that time. He learnt, in both places, the ordinary elements, and seems from his writings to have acquired a fair knowledge of mathematics. We may presume that it was intended he should follow his uncle's occupation ; but from some reason or other this did not come to pass. In 1648, when he was sixteen years old, he was removed to a clothier's business in Amsterdam, where he filled the offices of book-keeper and cashier. The time he remained at Amsterdam is uncertain, but it could only have been a few years, for at the age of twenty-two he returned to Delft, and married.

“Six years after his marriage he obtained an appointment at Delft, styled chamberlain of the sheriff. The duties of the office are clearly set forth in his commission, a document still extant. They were : ‘To open and shut the door of the chamber, both on ordinary and extraordinary days of meeting. To show honour and respect to the councillors ; to keep inviolate anything he might hear

in the council chamber ; to keep the chamber clean ; to make the fires ; also to preserve the place from fire, and to do all that a good and faithful chamberlain should do.'

"Whatever the title of the office might be, the duties were evidently those of a beadle. No doubt he did and could set meaner hands to do the scrubbing and sweeping, but the fact remains that, as the Scots made their greatest poet an exciseman, so the Dutch made their philosopher a beadle. The salary was small, about £26 a year. He held the post for thirty-nine years, and the salary was paid to him until his death."

The account thus offered by Mr. A. Wynter-Blyth tallies well with all that is conveyed to us by the writings and works of Leeuwenhoek. I had written before I knew these curious and interesting details the following passages:—Whatever the pursuits were, probably those of a treasurer or comptroller, by which Leeuwenhoek subsisted, they afforded him leisure for abundant means of original investigation, and for carrying his philosopher's lantern in an easy mood to a truly patriarchal period of life. That he was in comfortable, if not in affluent, circumstances is clear from the character of his writings ; that he was not troubled by any very anxious and responsible duties is certain from the continuity of his scientific labours and from the independent cheerfulness of his sayings, which gives them a charm equal to the delight of the teeming novelties with which they are pervaded ; that he was always at home and performing some regular duties which held him closely is most obvious from his descriptions ; that he possessed the respect of all persons, great and small, is equally clear ; that he could secure the services of persons of influence is discernible from the circumstances, that in 1673 De Graaf sent his first paper to our Royal Society, that in 1680 the same Society admitted him a fellow, that the Directors of the East India Company sent him specimens of natural history, and that, in 1698, Peter the Great paid him a call to inspect his microscopes and their revelations. Lastly, that he was a man in some subordinate office connected either with the municipality of Delft or with some great business there is as certain as all the rest—is, in truth, almost as plainly indicated in his letters and comments as if he had told us so in as many words.

From the facts now in our possession, then, Antony Van Leeuwenhoek, as a man of mere flesh and blood, stands fairly before us, earning his livelihood in about as simple a way as it

could be earned, and following up his scientific discoveries as a pure pleasure resting upon an almost sacred gift for work and a command to communicate it. To his immediate friends and equals he would be an oddity much as our own Stephen Gray, who invented the first electric line, was to his. Who would think, indeed, that one who was deputed to open and shut the door of the council chamber, and show honour and respect to the councillors of the little town of Delft, would in after-days have such a name that learned men of other nations should make it a point of scholarship to find out what he did for a living? Truly it is a wise ordination that the greatest of the earth should be blind to their own immortality. They might go insane and lose it all were they not in this manner protected from the lust of self-adulation.

What appearance the Bedellus presented to his fellow-townsmen is shown in the portrait of him by the painter I. Verkolje, in the year 1695. He, the Bedellus, was then in his midday fame, still healthy and strong, and distinguished as "Antonius A. Leeuwenhoek, Delphensis, R.S.S. Æt. LXIII. MDCXCV." I have another copy of the same portrait in my edition of Hoole, engraved in or about the year 1800 by Anker Smith, an Associate of our own Royal Academy. Smith's engraving is more finished than the one by A. de Blois here reproduced, but does not offer so robust an expression and character. As we study the portrait, we see at once a mixed racial type. The Semitic and Teutonic races combine as equally in the look of the man as in his work. A Jewish Saxon, of all organisations for industrious, solid, original, and wise work, the best of best; obstinate and yet imaginative; its very obstinacy a virtue, saving it from flying too far wild by its imagination, and preventing it from running after or envying other men's labours, or caring much for any labours except its own. In the face peering through the big wig, there is the quiet force of Cromwell, with the delicate disdain of Spinoza. A deep, soft voice accompanied, I warrant, that look, and a sly humour, which made the councillors themselves nervous without giving them occasion for anger or offence. A broad forehead; full dark eye; thick-set nose; thick lips with small moustache, according to the fashion of the time; a round, closely-shaven chin; and a short veritable bull-neck, well concealed by the loose kerchief, worn as Isaac Newton wore his, the most graceful, surely, of all kerchiefs ever worn since that article of attire came into use.

There are extant other portraits of our Bedellus, namely, an oil-

portrait in the possession of Dr. Kaatthoven, of Leyden—date and painter unknown—and engraved in 1875 by P. J. Haaxman; a profile, struck on a silver medal in 1716, when the subject of it was in his eighty-fourth year; some plaques of Delft ware; and a bust in the old Reformed church of Delft in which the remains of the Bedellus were entombed. The portrait belonging to Dr. Kaatthoven represents, Mr. Blyth considers, “the great man in his prime, grave and thoughtful, his features regular, forehead large, brows bushy and arched, nose rather thick, lips well-formed, shaven chin pronounced and full, long wavy tresses of the wig falling on the shoulders, neck enveloped in loose, easy neckcloth, with the ends hanging down over the chest, and dress a kind of silken robe or dressing-gown. He is presented seated at a table with compasses held in his right hand, as if he had just been drawing a mathematical figure; and on the table is a globe and the diploma of the Royal Society. In the profile, on the silver medal, his face is clean shaven, is thinner, sharper, and more wrinkled, with the cheeks hollow, as if he had lost most of his teeth.”

I trust now that we have, in our mind's eye, a fair knowledge of the unique Bedellus of Delft as he lived and moved in the sphere in which he learned and laboured truly to get his own living. If, as strangers, we had been introduced to him in the streets, on the bridges, or in the squares of Delft, we should, I doubt not, have been struck with his manner, conversation, and general knowledge of all things and all men. We should have heard of the great people who had been to see him, the professors from Leyden, Boerhaave, and Bidloo; the philosopher Huygens; and the mighty Peter, Czar of all the Russias. We should detect that everybody he could reach, from Captain Isaac van Krimpen, who brought him the eye of a whale, to the glass blower who came to the fair at Delft, and to the little domestic servant who caught fleas for him, taking care not to injure them by pressure and keeping them for him in a glass tube, was sure to be impressed into his service. We should see strange proofs of his mechanical skill; of the new sight which he had invented, and the curious objects hitherto concealed from mortal eye, which he had seen and let others see. We should hear the pride of Delft expressing itself, of the great foreign fame of this native of Delft, and of the astounding honours which England and France had bestowed on him, the Dutch Bedellus.

This fate, perhaps fortunately, is not ours; but it is ours to look at the Bedellus, whom we now know, by another study; by his long-

enduring merit through his works which have given him his endurance. Let us then turn to him in this new light. Let Bedellus, passing away as such, henceforth appear in some of his well-earned immortality as a leader of science.

THE MAN OF MANY LETTERS.

Like Samuel Richardson, Antony Van Leeuwenhoek was a man of many letters. All, or nearly all that he did in the literary way was after the manner of an epistle. He wrote his epistles from nature, and sent them to the best commentators he knew of for commentation, publication, and circulation.

The French Academy of Sciences, of which he was elected corresponding member in 1697, got twenty-six ; but the lion's share fell to our young Royal Society, which, in fifty years—namely, from 1673, when Dr. Regnerus de Graaf communicated a first paper, entitled *A specimen of some observations made by a microscope contrived by M. Leeuwenhoek in Holland*, to 1723, the year of Van Leeuwenhoek's death—received from him for its archives three hundred and seventy-five letters and papers. The subjects of research are most varied. Hoole's selection contains references to over one hundred and fifty topics in natural history, on which his master had cast thought and light, and Hoole omitted, apparently from what he considered delicacy, all reference to his author's researches on generation and other allied subjects.

The works themselves, except that they lie in the domain of natural history, are disconnected, and appear in no order of systematised study. The philosopher was led by what transpired at any moment to lead him.

We find, therefore, in the letters a natural incongruity, but atoned for by a rich fulness of interest, wherever the details may be tackled, that almost defies any natural scholar to begin a theme and not study it to the end. The difficulty, indeed, is in beginning to read, and the reason, I think, why Leeuwenhoek is so little understood rests on this difficulty. For a considerable sum I bought two volumes of Leeuwenhoek, finely illustrated, not long since. The volumes were eighty-five years old, and not a page cut.

As we read through the works we see that their originator copied from no authority whatever, except from nature. He may be right, he may be wrong in his statements, but whoever criticises him must go to the prime authority, his authority, for the criticism. This

probably was an unintentional cause of offence to some of his cotemporaries, and it has been so to many who have followed. This also led him, equally unintentionally, to cross other men's paths with original observations which were not absolutely original. So he crossed our own brilliant and petulant philosopher Robert Hooke, author of the *Micrographia* a cotemporary of his, but he did not mean to do it.

THE WORKS BRIEFLY CLASSIFIED.

I have spoken of the variety of the work, and more I scarcely dare to speak, lest I should be carried too far into description. I must, therefore, be content to name briefly the greater subjects in this place, securing a larger space for one or two of them later on.

Animals of Different Kinds.

Animalcules or microscopic animals; the ant; cantharides; cochineal as an animal product; fish, a number of curious notes on, with special reference to the herring; the eel; the flea; the fly; the frog; the fluke of sheep; the gnat; the locust; the louse; the maggot; the millipeda indica; the mite; the sea and fresh-water mussel; the scorpion; the shrimp; the silkworm; the snail; the spider; the tadpole; the viper, and its poison; the weevil, or corn beetle; the whale.

Plants, Vegetables, and their Products.

The ash tree; the bark of trees; the beech; boxwood; the cocoa tree and cocoa nut; coffee; corn in granaries; cotton; ebony wood; elm timber; excrescences on leaves of oak, producing the gall nut; excrescences on thistles and willow leaves; fir timber; the gall nut; the hop; the lime tree; mace; the nettle; the nutmeg; oak; pareira brava, the root of; peat; Peruvian bark; pepper; periwinkle; rushes and their formation; sage; seeds of trees and plants; tea, its nature and properties; tobacco, the seed of; vinegar; wheat; the willow; various notes on timber, and the best season for selling it.

Structures and Functions of Animals.

Acids in the stomach, and their part in digestion; the blood, its parts, its globules, its minute circulation, its coagulation, the

frequency of its course from the heart, and many other details ; breath, shortness of ; bones and their formation ; the brain in different animals and its texture ; the eye and its crystalline lens ; feathers of birds and insects ; fibres of animal flesh ; generation of animals, and refutation of equivocal or spontaneous generation ; spermatric animalcules ; embryology ; hair ; gout stones ; the heart, and its construction in several animals ; the intestines, their membranes and vessels ; muscular fibre and its construction ; nerves and their construction ; the optical organs in the eye of a silk-worm moth, a beetle, a shrimp ; the optic nerves of the fly ; insensible perspiration ; quills and their formation ; rennet, its nature and properties ; stones in the bladder ; scales of the human shin and of animals ; scales of the lining membrane of the mouth ; the spleen, its structure and function ; the white matter or fur which forms on the tongue in fevers.

Philosophical Subjects, Various.

Amber ; the earth, and phenomena in its diurnal motion ; gun-powder, various observations on its nature and properties ; the magnet or loadstone, various observations on ; moxa used by the Chinese for cure of gout ; negroes, and the cause of the blackness of their skins ; paper burnt, supposed to be an ancient or vegetable production ; the sea, its pressure at great depths, and the cause of its gradual elevation in regard to the land.

Such are some of the subjects of study to which Antony Van Leeuwenhoek devoted his industrious life. In investigation he used every means which came under his command, but one means especially. To that let us turn our attention,

THE MICROSCOPIST AND HIS MICROSCOPES.

Van Leeuwenhoek was not merely blessed with industry, he was blessed also in being a fortunate man of science. He flourished at the birth of a new era in scientific discovery, and, taking the lead in the new work, got a reward which must, by necessity, have come to some others if not to him. For him the illustrious Jansens had invented the microscope, and from their invention a few men had begun to unravel the minute unseen worlds of structure and life. Our ever-inquisitive naturalist, getting first hold of this art, and being of a mechanical turn, began to cultivate it ; to make new eyes ;

and, to discover, through what he made, untold, nay majestic wonders—a new world.

The most curious bit of history, connected with his microscopical researches, is that which bears on the perfect simplicity of the microscopes he employed, and on his own skill in their construction. The simple instruments were all made with his own hands, even to the grinding of the lenses; and in the art of using them he must have been purely self-taught. Both these facts are proved without any kind of doubt in the works of Leeuwenhoek.

What these instruments were we know precisely, not only from their author's own description, but from the circumstance that he bequeathed twenty-six of them, in a small cabinet, to the Royal Society, which cabinet and instruments were presented to the Society through the President, Martin Folkes, were described in the Transactions, No. 380, and were afterwards most carefully reported upon and delineated by Henry Baker in two of his famous microscopical works, *The Microscope Made Easy*, 1744; *Employment for the Microscope*, 1764.

The description of one of his microscopes by Leeuwenhoek himself is given so clearly in his essay on the circulation of the blood in the tail of an eel that any one with a mechanical mind could construct from it an exact copy of the instrument. This instrument Bertram Richardson has depicted in fig. 1, precisely as it was when in use by its inventor. A stand of brass, A, with a hole at the top and bottom, was made to hold the object, B, in this case an eel, in a tube of glass, C. The tube could slide up and down according to the will of the observer, and was kept in position by two springs of well-tempered brass. The lens forming the microscope was held in a perforation through the silver plate, D, fixed to a support which stood out at right angles to the frame. The lens, as will be seen, was nearly, but not quite, in the middle of the plate, and opposite to the tail of the eel in the glass tube. The lens, by a screw movement on the plate, could be brought nearer or further from the tube as required. It was a single lens carefully ground. The instrument entire seems to have been held up by the hand, from its frame, opposite to the light, and, when in use, the lens must have been close to the tube, because Leeuwenhoek tells us that in order to prevent the lens being scratched by the tube, in removing the latter, he caused the metal plate carrying the lens to have a side movement by which it could be turned out of the way when the tube was either removed or inserted.

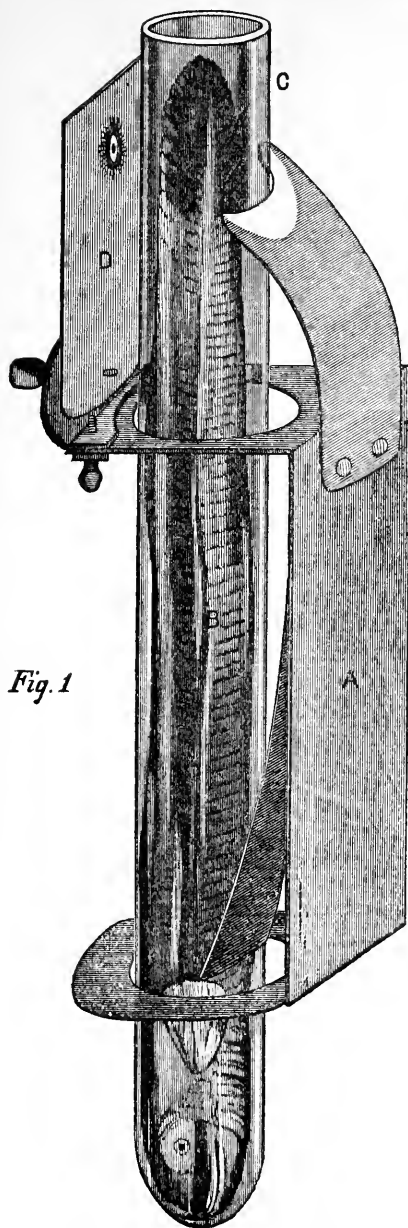


Fig. 1

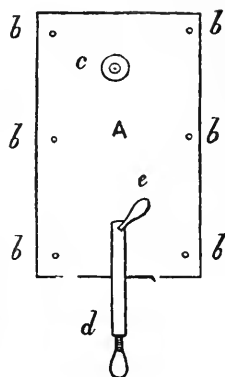


Fig. 2

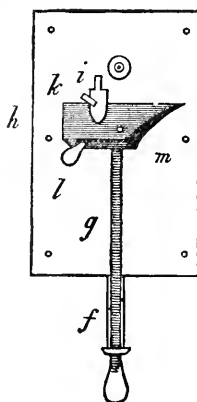


Fig. 3

The microscope thus described was a special one, designed for a special purpose. The microscopes commonly employed, the specimens of which were bequeathed to the Royal Society, were still simpler, and, with drawings of them copied in figs. 2 and 3, are described by Mr. Baker as follows :—

“The two sides of these microscopes are shown in the figures (figs. 2 and 3). The eye must be applied to the side, fig. 2. The flat part A is composed of two thin silver plates fastened together by little rivets, *b b b b b b*. Between these plates a very small double convex glass (called by mathematicians a lens) is let into a socket, and a hole drilled in each plate for the eye to look through, at *c*. A limb of silver, *d*, is fastened to the plates on this side by a screw, *e*, which goes through them both. Another part of this limb, joined to it at right angles, passes under the plates, and comes out on the other side (see fig. 3) at *f*; through this runs, directly upwards, a long fine-threaded screw, *g*, which turns in and raises or lowers the stage, *h*, whereon a coarse, rugged pin, *i*, for the object to be fastened to, is turned about by a little handle, *k*, and this stage, with the pin upon it, is removed further from the magnifying lens, or admitted nearer to it by a little screw, *l*, that passing through the stage horizontally and bearing against the back of the instrument, thrusts it further off when there is occasion. The end of the long screw, *g*, comes out through the stage at *m*, where it turns round, but acts not there as a screw, having no threads that reach so high. These microscopes are plain and simple in their contrivance, all the parts are silver, fashioned by Mr. Leeuwenhoek’s own hand, and the glasses, which are excellent, were all ground and set by himself.

“Of the twenty-six microscopes I examined, one magnifies the diameter of an object 160, one 133, one 114, three 100, three 89, eight 80, two 72, three 66, two 57, one 53, and one 40 times.”

And now, having seen the instruments, unfortunately long since lost, with which Leeuwenhoek pursued his new lines of research and founded a new department of science, we may, with advantage, in a concluding chapter, glance at the work of this original master from those aspects of it which are of most value to the medical scholar.

THE FOUNDER OF HISTOLOGY.

In the physiological sphere Leeuwenhoek holds rank as the founder of that branch of physiology, or, using a wider term, biology, to which the term histology has been applied. He did not invent

the term ; it has been invented by workers of a much later day, but he introduced the method and the practice of the science which that term embraces.

Discovery of the Minute Circulation of the Blood.—It is the common idea that Leeuwenhoek was the first to discover the red corpuscles of the blood, and probably ninety out of a hundred persons who recognise his name, do so as the discoverer of the corpuscles. The mistake is absolute. The discovery was made before the time of Leeuwenhoek ; he, himself, never speaks of it as his own ; and, in plain truth, he made a blunder as to the construction of the corpuscles, which shows that he was not so conversant with them as some of his cotemporaries.

But what he did discover was the final and unmistakable proof, through the sense of sight, of the circulation of the blood. What Harvey had demonstrated by undeniable inference, Leeuwenhoek, in 1686, had made visible to the eye. His credit is that he brought the movement of the blood, through its vessels, under the dominion of the most certain and exact of the senses. He made darkness visible. In what way the indefatigable microscopist performed this task is one of the most fascinating chapters in the whole history of science. It is recorded by its author in two or three of his famous letters, but fully and most completely in one entitled : *On the circulation of the blood ; that it is not discoverable by the sight in any human body, nor in the bodies of terrestrial animals : the same completely seen in fishes, and the nature of it particularly described.*

In this essay Leeuwenhoek begins by telling his readers that the blood is composed of exceedingly small particles named globules, which, in most animals, are of a red colour, swimming in a liquor, called by physicians the serum, and that by means of these globules the motion of the blood becomes visible, which otherwise would not be discernible by the sight. He had often tried to view the circulation of the blood in terrestrial animals, but unsuccessfully, because no parts were sufficiently transparent. He tried the experiment with the comb of a young cock, but failed ; he tried it with the gills of the same animal, and then saw it running in an inconceivable number of vessels, but it was impossible to trace the circulation from the immense number of vessels crossing each other in all directions and giving rise to the redness of the structure. After this he made his observations on the ears of white rabbits, by placing the ears before the microscope ; but, with all his pains, he could not do more than see the blood running with great swiftiness through the arteries

and veins. His greatest expectation next turned on a bat, and, putting the membranous wing of one under the microscope, he saw the circulation most clearly both in the arteries and in the veins.

His next great advancement came when he directed his microscope to the tail of the tadpole. Upon examining this, he exclaims :—"A sight presented itself more delightful than any mine eyes had ever beheld ; for here I discovered more than fifty circulations of the blood, in different places, while the animal lay quiet in the water, and I could bring it before my microscope to my wish. For I saw, not only that the blood in many places was conveyed through exceedingly minute vessels, from the middle of the tail towards the edges, but that each of these vessels had a curve, or turning, and carried the blood back towards the middle of the tail, in order to be again conveyed to the heart. Hereby it plainly appeared to me, that the blood vessels I now saw in this animal, and which bear the names of arteries and veins, are, in fact, one and the same, that is to say, that they are properly termed arteries, so long as they convey the blood to the farthest extremities of its vessels, and veins when they bring it back to the heart. And thus it appears, that an artery and a vein are one and the same vessel prolonged or extended."

In further observations he describes how he found that in the course of the corpuscles of the blood through the minutest passage from the artery into the vein one globule passed at one time, and this he opined must be the plan in all animal forms up to man himself, that is, one fine vessel for one globule.

From the tadpole he passed to the frog, viewing the circulation in the web of the foot, and explaining, by the way, that the red colour of the blood is due to the accumulation of the globules. After the frog the tails of fish were examined in the same manner and with the same results. After the fish the eel afforded him the means for another of the most remarkable of all his studies.

The temptation is pressing to tender addition upon addition to this portion of the life-work of our discoverer. Every sentence, indeed, of the chapter now in hand is a revelation. The minuteness of the smallest vessels is dwelt upon as a necessity for the equal and universal nutrition of the body. The change of colour in the blood, from bright arterial to venous, is shown as occurring in this part of the circuit of the blood. The fact that the blood yields its nutritious fluids to build up structures through the infinitely thin walls of this minute circulation is expounded ; and the effect of arrest of the

circulation is elucidated with a perspicuity that is positively astounding. He had noticed that blood when extravasated from a bruise is coagulated, and fixed for a time in the bruised part, but that after a while it is dispersed. He had been of opinion that in this dispersion, when there is no "exulceration," the blood is dissolved and carried off by perspiration. But in the tail of a tadpole he observed an obstruction in a vessel from a coagulum, giving rise to a to and fro movement in the vessels on the heart side; he noticed that, in time, this movement dilated subsidiary vessels; and that, finally, it succeeded in slowly removing the clot altogether. From this observation he reasoned out the time it would take to remove an extravasated portion of blood, and, supposing the blood to be driven from the heart at the rate of 75 strokes a minute, 4,500 an hour, 108,000 in a day and night, and 1,080,000 in ten days, he held that in ten days over a cubic inch of blood would, by this gradual resolution, easily be removed, with restoration of the circulation to its natural course. In another observation, in continuation of the same inquiry, he saw anastomosis, and, to his great surprise, witnessed the sudden formation of a new minute artery and vein below an obstructed part.

DISCOVERIES IN ANIMAL STRUCTURES.

On his discovery of the minute vascular circulation the immortal fame of Leeuwenhoek rests. But when that is said there remain many more discoveries, which added together bring forth, perhaps, as great a result. In his description of the structure of bone and tooth, Leeuwenhoek went half way towards Clapton Havers and the Haversian system. The tooth he admirably delineated. He discovered the fibres of the crystalline lens and their distribution, leaving a drawing of them which is still repeated and republished. He unravelled voluntary muscular structure into fasciculi, fibres, and filaments, defining perfectly the "stripe" now so familiar; he showed himself conversant with the membranous sheaths of voluntary muscles, and with the special muscular construction of the heart.

To Leeuwenhoek must be accredited the earliest attempts to determine the structure of the brain and of the nerves. He distinguished, carefully, the particular character of the grey matter, and supposed that its darker or grey colour was caused by the greater number of blood vessels which pass into it; while, with equal care, he explained the fibrous structure of the white matter. He studied

the structure of feathers and of hair; determined the squamous nature of the outer part of the skin, and compared that structure with the epithelial scales of the mucous membrane of the mouth. He gave a very clear account of the fibrous structure of the spleen, and some really beautiful illustrations of the blood vessels and membranes of the intestines from a specimen which had been brought to him by Professor Bidloo, the colleague of Boerhaave, of Leyden.

DISCOVERIES IN PATHOLOGY.

To these contributions to histology on its physiological side must be added others which are pathological. The liver fluke in sheep was well described by him, and a curious hypothesis supplied in respect to this fluke, viz., that in dry seasons it dries up and is buried in the earth of the meadows, from whence, in the wet seasons, it rises to the surface and, under the influence of the moisture, revives. He investigated calculi from the bladder, and, treating of their solution by medicines taken internally, declared that those physicians who pretended to have medicines of solvent efficacy were "like blind men talking of colours." He also investigated the "chalk stones" found in persons affected with gout, and supplied some views on the nature and value of the moxa in relation to treatment. On the pathological side, however, the most original observation of Leeuwenhoek relates to his researches as to the cause of the whiteness or fur of the tongue in fevers. Up to his time it had been conceived that this white matter or fur proceeded from fumes or vapours rising from the stomach, which view he disputed on experimental evidence. In September 1707 he suffered from an attack of fever, and on the fourth day of the disease, on looking at his tongue with a magnifying glass, he saw it white. Thereupon he scraped a little of the white matter off with his penknife, and, after examining it with his microscope, came to the conclusion that it was an exudation from the serum of the blood. In 1708, under like circumstances of fever, for which—as he takes peculiar care to inform us—he swallowed no medicine, he again examined the fur from his tongue, to find in it an immense number of minute hair-like particles. Some portions of the fur he boiled in pure water, by which the particles were separated. These particles he washed with rain water, and placed in a glass tube, and later on he found the water laden with an innumerable quantity of animalcules, which he imagines were nourished by the particles.

In the organic deposits which form between the teeth, even between teeth which are kept well cleaned with salt and rubbed hard with a cloth, as his own were—so that few persons at fifty could show so good a set—he extracted a sort of white substance like a mixture of flour and water, which, mixed with pure rain water, showed some kinds of small animalcules, the motions of which “were very pleasing to behold.” He obtained the same from the teeth of two ladies who were very punctual in cleaning their teeth; while from between the teeth of an old gentleman, who was less particular, he secured an incredible number, so that the water which contained them “seemed to be alive.” Toothache in a hollow tooth may, he thought, be sometimes caused by eggs from the cheese maggot lodging in the cavity and developing there. To this view he was led by the examination of three small maggots which had been sent him by Sir Hans Sloane, with a letter stating that they had been found in a person’s decayed tooth, and had been expelled by fumigation. These maggots he detected were “the offspring of a small fly, which lays its eggs in cheese.”

From examining the skin Leeuwenhoek came to the conclusion that a callus of the cutaneous service is only caused by a great number of scales heaped one upon another, and suggested that the removal of stains from the hands is ensured by the rapid casting-off of scales. He used the microscope also for the first time in what might be called a medico-legal inquiry. A Mr. Yonge sent to the Royal Society a bunch of hair which he supposed had been voided from the bladder by a female patient. Leeuwenhoek examining the substance microscopically, declared it to be wool from the heel of a stocking.

Researches Analytical and General.

In some chemical researches Leeuwenhoek also led the way. He discovered the oblong saline particles of coffee; the saline crystalline matter of tea; the animal nature of cochineal; the nature and structure of the gall nut; some changes in phosphorus under heat; and many other curious natural phenomena.

Lastly, he made many new and valuable observations of a more general kind, which were as original as they were important. He collected in a closed vessel the water which exhaled from one of his hands, and by that research estimated that he perspired from his whole body twenty ounces of fluid an hour. He advanced a view

that fishes never die of old age, because their bones never grow hard ; and, reflecting on the enormous bulk of certain marine animals, such as whales, he conjectured that some of those which were taken at the beginning of the whale fishery might have been over a thousand years old. He calculated the ages of trees, like the oak, by the circles seen in a transverse section, and explained how the circles are produced.

In 1677 Ludwig van Hammer, of Dantzic, drew his attention to the spermatozoa, which he had seen three years before, but had not properly recognised. After this he examined these bodies from various animals—from whales to spiders. In these researches he contested, with Dr. Lister and others, against spontaneous generation, sustained the Harveian idea that all animals proceed from ova, and founded the science of embryology. He studied the theory of fermentation of blood, and by experiments on the extraction of air from blood, in which he exhibited most original ingenuity in the invention of pumps for the extraction of gases from blood, from serum, and from water, he declared against fermentation on the ground of absence of gaseous products in blood. He inferred that the corpuscles of the blood could not obtain air because, as they sink in the serum to the bottom of the containing vessel, they must be specifically heavier than the serum. He criticised the opinions of the medical men of his time who, when called to sick persons complaining of pains in this or that part, tell them that the wind has got into that part, or that it is a windy complaint, and the like ! He wrote a history of a great storm on the 8th of December, 1703, telling that his house, which faced the north-east, was so visited that the windows were coated with crystals which the microscope showed to be of common salt, and predicted that where salt had fallen on the earth there would be fruitful growth—a prophecy which being fulfilled would add, doubtless, to the common belief that he was a “conjurer.” He wrote a note on a German who pretended to cure diseases by sympathy ; and at eighty-five years, in response to a suggestion by a respectable gentleman that, notwithstanding his advanced age, he should go on with his inquiries, because “those fruits which ripen in autumn are by nature the most durable,” he wrote an essay on the formation of rushes and on the structure of nerves. But here I must cease, or I shall commit myself to a volume instead of a chapter.

Such are a few of the physical advances of this truly great Dutch philosopher. They were blurred by one or two obstinacies ;—a

refusal to admit the existence of perspiratory openings on the skin; an idea that the blood does not go round the body fourteen times an hour; and that the arterial pulse is not caused by the direct motion of the heart. But what greatest work of man is free from some blur? When the new knowledge and new discovery of this man is collected, what a monument of industry, insight, genius, is revealed!

ULTIMA LINEA.

In Delft, on August 28th, 1723, our *Bedellus Immortalis* of that place, and of all places, yielded up his spirit after a terrestrial conflict of ninety-one years. We may suppose that he died after a completed career of body and mind. We know that he died in the profound respect of all who knew him, and that he was laid in the choicest fane his fellow-men could find, the old Reformed church of his fathers, in which edifice the remains of the famous Admiral Van Tromp already reposed. In his life he had many scientific cotemporaries whose names, like his, are of undying fame. But for real greatness of originality and industry, as a revealer of nature to man, he had, I humbly think, only one head above his own, that of the mightiest of the mightiest—of Isaac Newton.

William Cheselden, F.R.S., and the New Era of British Surgery

IN the latter part of the reign of Queen Anne, during the whole reign of the first George, and to within six years of the close of the reign of George II., the one great Chirurgeon who represented chirurgical art in London was William Cheselden.

The career of this luminary in the world of physic presents many features of historical value, scientific, social, personal. He was in all these particulars a strictly representative man. He fitted in precisely with the age in which he flourished. He lived in sympathy with his age; and, with one or two exceptions, he lived in harmony with his most distinguished contemporaries. From the masses he won admiration, from the units confidence, and from some, of whom it would have been least expected, affection.

William Cheselden was born on October 19th, in the year 1688, at the little village of Somerby, in the county of Leicester. The house in which his birth took place, though in the parish of Somerby, is two miles from the village, and forms, actually, one of the last houses in a street which seems to belong to another village, called Burrow-on-the-Hill. The house is standing, and the visitor is to this day shown the room in which our surgeon drew his first breath. The house is still in fair preservation, and I am indebted to my old friend, Dr. John Jackson, of Somerby, for a photograph of it, which Bertram Richardson, who has also supplied the copy of the portrait accompanying this memoir, has faithfully reproduced for me. Within half a mile from this house, and within view of it, is the famous Burrow Hill, one of the grand old remains of a British and afterwards Roman encampment.

From the playground of the parsonage of Burrow, where I went to school, Cheselden's house is but an arrow-shot, and as I had the honour to be born in the same village as he, the house often set me,

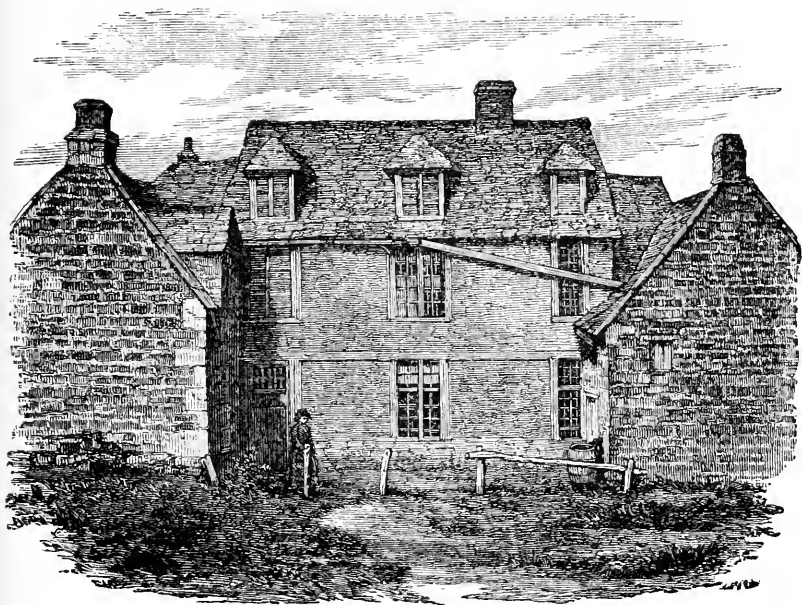


your most obt. Humble
servt W. Chetelden



as one destined for his profession, wondering, in my child days, what manner of man he would be. His, consequently, was the first medical life I ever essayed to write. It formed one of my series of *Our Great Ones of the Past*, published in the *Medical Times and Gazette* a quarter of a century ago, and from it, with some revisions and additions, I rewrite many of the facts that are to be told in this place.

The ancestors of Cheselden were from the adjoining county of



THE BIRTHPLACE OF WILLIAM CHESelden.

Rutland, and another William Cheselden, a relative of the surgeon, residing at Ridlington, in Rutland, was high sheriff of his county about the time when our Cheselden was at the zenith of his fame. A second relative, who was in the medical profession, was Dr. George Cheselden, of Leicester.

Of the earliest career of William Cheselden but little is known. He received a classical education, and it is probable that he commenced his professional life as a pupil of Mr. Wilkes, a practitioner of great repute, in Leicester, in the beginning of the eighteenth

century. In 1703 we find him, then in his sixteenth year, in London as the house pupil of the distinguished anatomist Cooper, or Cowper—the name is spelt in both ways by contemporaries—under whom his studies were pursued with great vigilance.

From these first studies in surgical art he passed through all the gradations common in his day, taking from the first the surgical side of the professional life as his own. This is proved by the circumstance that he became a member of the Company of Barber Surgeons, in connection with which body we shall find him playing an important part in a change which affected all the future of English barbers and English surgeons. To make himself better master of his craft, he entered as hospital pupil of the famous surgeon Ferri, surgeon-in-chief to St. Thomas' Hospital.

IN SCIENCE AND SURGERY.

Emancipated from student life, and qualified according to the manner of his time, perhaps after all the freest and best manner, Cheselden commenced his scientific career by giving readings in anatomy, by publishing an anatomical syllabus, and by pursuing a learned scientific culture.

In the month of March 1712 he presented his first paper to the Royal Society. A Roman urn had been dug up in the site of the old Roman encampment at St. Albans. The urn was inscribed "Marcus Antonius," and contained the remains of a man of extraordinary size. The bones were examined and delineated by Cheselden, and the drawings and description comprised this, his earliest, contribution. The paper occupies the third of a page in the *Transactions* of the Society, the dimensions of the parts of the skeleton forming the leading topic.

"The circumference of the skull, according to its length, was described as 26 inches, and, according to its breadth, 28 inches. The greatest diameter of each os innominatum was 12 inches. The left os femoris was 24 inches long, having only one, and that the great trochanter. The right os femoris was 23 inches long, having three trochantric processes. Each tibia was 21 inches long. If all the parts were of due proportion this man must have been eight feet high." (*Phil. Trans.*, vol. xxvi., p. 436.)

Before the close of 1712 Cheselden was elected a Fellow of the Royal Society, and in the following year he sent to the Society another paper with illustrated drawings. His descriptions in this

communication are pathological, the title *Some Anatomical Observations*. The observations included :—

1. A brief history of the heart of a woman who died of dropsy, and in whose aorta, at the semilunar valves, existed two chalk stones. The left ventricle dilated. The stones, the author inferred, were the cause of the dropsy.

2. A bone from the falx of a man who died of violent headaches.

3. A bone from the septum ventriculorum of a man who died hydropic, with the pericardium adherent.

4. The right optic nerve wasted and discoloured.

5. An illustration of flattening of the optic nerve from the pressure of the brain, the ventricles of which were filled with lymph.

6. An instance of three spleens taken from one body.

7. Two spleens taken from one man.

8. Two spleens from a woman. All these spleens had proper vessels, and the whole of the spleens in each case were equal in size to the one usually met with.

9. A heart with the vena azygos inserted into the right auricle, and the descending cava coming round the basis of the heart, above the aorta and pulmonary vessels, to enter the auricle, with the ascending cava.

10. A ureter, double two-thirds its length next the kidneys, and distended by stones pressing through it.

11. The Fallopian tubes in an impermeable state.

(*Phil. Trans.*, vol. xxviii., p. 281.)

In the course of this same year, 1713, Cheselden brought out his first treatise. He had, as before said, drawn up a syllabus of anatomy. He now presented his *Anatomy of the Human Body*, adding the syllabus to the end of it. His reputation, already high, was greatly enhanced by this work, which ultimately went through eleven editions, and was accepted for many years as the anatomist's *vade mecum*. It cost five shillings, was dedicated to Dr. Richard Mead, and bore on its title-page a quaint motto from Spenser :—

“Of all God's works that do this world adorn,
There is not one more fair and excellent
Than is man's body, both for power and form.”

The *Anatomy of the Human Body* was not intended for minute anatomists. “I have pretty much neglected,” says its author—preface to fourth edition—“the minutiae in anatomy, nor have I been very particular about those things which cannot be understood

without being seen, and being seen, need no description; but have endeavoured to be more explicit about those which are of greatest use in philosophy, physic, and surgery."

This promise Cheselden kept; and, although a modern student would find but little help from him, yet the book in its day was vastly superior to anything before it, and the fact, that in bringing out the fourth edition, the plates of the previous one were found to be worn out—from three to four thousand copies were printed from them—indicates the popularity of the work. It was the author's endeavour to make it more than a mere descriptive treatise; he supplied in it various physiological facts and theories, and even cases of disease, in order to illustrate particular points of practical instruction.

His physiological views were plain and common sense, but not original. His review on the process of digestion was perhaps the best in the work. He here destroyed effectually Pitcairne's hypothesis on the mechanical or muscular force of the stomach—"computed to be equal to a 117,088 pound weight"—as the cause of digestion, and concluded by saying that "digestion is performed by a menstruum, which is chiefly saliva, assisted by the action of the stomach, by the abdominal muscles, and by that principle of corruption which is in all dead bodies; for digestion is no other than the corruption of our food, and, therefore, quantities of hot spirits, which hinder the corruption of animal bodies, hinder digestion." From this period Cheselden's brilliant professional career was fully secured. He was elected surgeon to St. Thomas' Hospital, in the place of Mr. Ferne, his former teacher, and went on his way rejoicing.

In 1717-18, as it would seem from Cheselden's account, Dr. James Douglas read a paper before the Royal Society on *The Operation for Stone by the High Method*. This paper does not appear in the *Transactions* at that time, although another paper from the brother of this author, John Douglas, does appear. (*Phil. Trans.*, 1722, vol. xxxii., p. 10.)

Cheselden's mind was now turned to this mode of operation, and, in 1722, he commenced to cut for stone by the "high way," following, in this respect, in the steps of Pierre de Franco, of Lausanne, and of John Douglas, before-named.

The success which attended this operation in Cheselden's hands was considerable; and having cut nine patients with success, the operation became exceedingly popular. He was, indeed, now so

eminent, that Dr. Stukeley, in writing his *Prospect of Vernometum, or Burrow Hill from the Leicester Road*, inscribed it to "Wille Cheselden, *Chirurgo Peritissimo Amico*."

In 1723 he published his work on the *High Operation for Stone*, prefacing it with an account of a lateral operation as performed by Professor Rau, of Leyden, who took the hint of the lateral operation from the famous Frère Jacques. Cheselden's history of Rau's operation was imperfect, being derived rather from the statements of students of the Leyden professor, who had seen the operation performed, than from his own knowledge. In 1725 a treatise appeared anonymously, entitled, *Lithotomus Castratus; or an Examination of the Treatise of Mr. Cheselden*, a severe critique, in which Cheselden is unjustly accused of plagiarising from Dr. Douglas. This critique was judged to have been written by Dr. Douglas himself; but there is intrinsic evidence that it was done by John Douglas, the surgeon, and brother of the doctor, a man of an inferior cast of mind, and whom we shall meet with again. The attack did Cheselden no injury.

In 1725 Albinus, the distinguished successor of Rau in the University of Leyden, published an accurate history of Rau's lateral operation; for it is remarkable that Rau himself left this labour undone, so that his operation might never have been known but for Albinus.

Albinus, immediately on its publication, sent a copy of his work to Dr. James Douglas, who at once laid an abstract of it before the Royal Society. From that time Rau's operation excited great attention, and on the 7th of August, 1726, Dr. Bamber made the first trial of it on the living body at St. Bartholomew's Hospital. A few days later Cheselden did the same at St. Thomas', but in a modified way, viz., by filling the bladder first with water, leaving the catheter in the bladder, and then cutting on the outside of the catheter into the bladder. He was enabled in this way, in cases where no accident happened, to perform the whole of the operation in a minute, and with unusual skill.

Ten patients were thus operated on, and four of these dying, he tried the plan originally adopted by Rau, without modification; but the same want of success being again met with, he ultimately invented that lateral operation by which his name became so well, so widely, and so long known. His first new operation was performed on three patients on March 27th, 1727. The success which followed opened a new era in surgery. Twenty-seven patients

operated on in succession all recovered—a result never before achieved.

In the fourth edition of his Book on Anatomy, Cheselden added an appendix, describing this new operation, and, as his mode of operating has often been commented on, it will be satisfactory to follow him by giving his own description :—

“ This operation I do in the following manner. I tie the patient as for the greater operation, but lay him on a blanket several doubles upon an horizontal table, three foot high, or a little more, with his head only raised. I first make as long an incision as I well can, beginning near the place where the old operation ends, and cutting down between the musculus accelerator urinæ and erector penis, and by the side of the intestinum rectum. I then feel for the staff, and cut upon it the length of the prostrate gland strait on to the bladder, holding down the gut all the while with one or two fingers of my left hand. The rest of this operation is done the same as in the old way ; but in this way there being often small vessels, I always tie them with a ligature, passed under them by the help of a crooked needle.”

The flow of practice in free current, our operator went on with fortune in full favour until 1728, when he favoured the Royal Society with a communication which set all Europe by the ears. This paper included the history of an operation for couching, and was entitled *An Account of some Observations made by a young gentleman who was born blind, or had lost his sight so early that he had no remembrance of ever having seen, and was couch'd between thirteen and fourteen years of age.*

The fame of this operation was such that to Cheselden has often been falsely attributed the merit of inventing the very old operation for the cure of cataract. But the true marvel of the case lay in the circumstance that a youth, old enough to think and describe, and who had never seen any object, explained the sensations of acquiring the gift of sight. The history of the case was painted with a skilful and artistic hand, and the sensation it created was unparalleled. (*Phil. Trans.*, 1728, vol. xxxv., p. 447.)

The operation for couching, although generally so well received, was attacked by some ill-informed writers, one of whom did not scruple to criticise it in a book, entitled *A New Method of Recovering the Sight by Putting out the Eyes.*

In the volume of *Transactions* named above (page 451) will be

found another short paper by Cheselden, on an operation for closure of the pupil: *In cases where there is either a total closure of the pupil, or when the pupil is extremely contracted, and the inner edges of the iris growing to a cataract, or part of a cataract, after couching.* The knife used for this operation was edged on one side only; it was thrust through the sclerotic coat, and then forward through the iris, the edge being turned to the iris. In drawing it out, the slit or artificial pupil was made.

In this same year (1728) Cheselden was elected surgeon to Queen Caroline, and in 1729 he had the honour of being elected a corresponding member of the Academy of Sciences in Paris. He may be considered now as having reached the zenith of his fame. His position was unexceptionable. He was first surgeon to the Queen Wilhelmina Caroline, first surgeon of St. Thomas' Hospital, and consulting surgeon to the St. George's and Westminster Infirmaries. He now gave up the laborious duties of teaching anatomy, after twenty years' service, and with a success unbroken. His reputation on the Continent was as great as in this country. M. Morand, an ingenious lithotomist of Paris, and a member of the Academy of Sciences, came over to London expressly to see him operate; and so many various descriptions of his mode of operating were published, that Dr. James Douglas, with Cheselden's assistance, brought out a treatise specially devoted to a description of the Cheselden plan, "his operation and his whole operation." *Appendix to the History of the Lateral Operation for Stone, containing Cheselden's present method of performing it. By Dr. James Douglas. London: Strahan, at the Golden Ball, 1731.*

Among other Parisians who visited Cheselden and saw him operate was one who afterwards, in 1757, wrote an *éloge* of him in the *Mémoires de l'Académie Royale de Chirurgie*, and who in so doing took the trouble to obtain some biographical facts from the Cheselden family. At one operation for stone, at which this writer was present, Cheselden went through all the stages of it in fifty-four seconds. He afterwards gave his visitor the particulars of his method, on the condition that he should not communicate them until they had been laid before the Royal Academy of Sciences in Paris. The Academy defrayed the expenses of the visitor's journey, returned their thanks to Cheselden, and commenced a correspondence with him.

In 1731 Cheselden was rather less fortunate, for he lost favour at court, and this so decidedly that, when her Majesty the Queen

Caroline died two years after, from umbilical hernia, which was operated on unsuccessfully, he was not consulted. The cause of this loss of courtly favour is curious. A deaf criminal in Newgate was reprieved at the request of Cheselden, in order that he (Cheselden) might try a mode of treating deafness by puncturing the tympanum. On this point the *Monthly Intelligencer* of the *Gentleman's Magazine* for January 1731 gives the following :—"Saturday, January 2nd. Great talk of an experiment to be made on Charles Ray, in Newgate, a malefactor, reprieved on that occasion. The tympanum was to be cut by an instrument, in order to demonstrate whether the hearing proceeds from the tympanum, or the nerves that lie between that and the conception of the ear." The man's life was saved, but Cheselden, as it is said in a letter from Ford to Swift, "neglected" to perform the operation, which gave great offence in high quarters. If I may be permitted to judge, I should infer, not that he neglected the duty he had undertaken, but that his humanity shrank from the task. He did not, on reflection, choose to revive the school of Erasistratus, and make man an animal for physiological research.

Cheselden had not long to tarry for some compensation for royal slights. The year of 1732 was made memorable to the medical world as the birth-year of the Royal Academy of Surgery in Paris. By this Society he had the great distinction conferred on him of being elected the first Foreign Associate.

In the same year a youth, named Richard Yeo, aged twelve years, published a short poem, which is not without merit, entitled *The Grateful Patient*, in honour of Cheselden, who had operated on him for stone. The poem is printed in the *Gentleman's Magazine* for 1732, p. 769. After detailing the agonies he had endured previous to Cheselden's assistance, the grateful patient thus described the operation :—

"The work was in a moment done,
If possible, without a groan,
So swift thy hand, I could not feel
The progress of the cutting steel.
Æneas could not less endure,
Though Venus did attend the cure.
Not her soft touch, nor hand divine,
Performed more tenderly than thine
When by her help Iapis own'd,
The barb'd arrow left the wound.
For quicker e'er than sense or thought,
The latent ill to view was brought ;

And I beheld with ravish'd eyes
 The cause of all my agonies,
 And above all the race of men,
 I'll bless my God for Cheselden."

In 1733 Cheselden brought out a long-promised book, the *Osteographia*, a work in which he offered to his readers a delineation of every bone in the body as large as life. The *Osteographia* was dedicated to the Queen, though he must still have been in disfavour, and was published by a four-guinea subscription list. The book was as severely criticised as it was unseemingly lauded. Belchier praised it; Heister praised it; Haller showed fairly its merits and demerits, with his usual candour. The most violent critic of the *Osteographia* was John Douglas, who, as we before saw, was possibly the author of the *Lithotomus Castratus*. The critique of Douglas on the *Osteographia* was a low, unmanly, selfish production, and I am glad to correct an error often made by most biographers, that it was written by Dr. James Douglas, who, it is evident from his other writings, could have been guilty of no such production. Some months earlier, indeed, he wrote the *Appendix* on the lateral operation extremely commendatory of Cheselden, with whom he seems always to have been on terms of great intimacy.

John Douglas' asperities were harmless. It is true that he had a few faults to find, as that os hyoides was not figured; but the critique seems to have been written rather to give its author an opportunity of advertising another *Osteographia* of his own, and of a cheaper kind, than for any more honest or useful purpose. The *Osteographia* subjected Cheselden to the infliction of some horribly inflated verses, which an unknown doggerelist presumed to offer to his honour, and which I forbear to transcribe.

In 1735-36, there lay ill in the house of Cheselden, in or near to Queen's Square, Westminster, no less a man than Alexander Pope. The following part of a letter from Pope to Swift, and retained by Nicholls, will bear reprinting, as offering an opinion on the merits of our Chirurgeon:—"As soon," says Pope, "as I had received your last letter, I received a most kind one from you expressing great pain for my late illness at Mr. Cheselden's. I wondered a little at your queræ who Cheselden was? It shows that the truest merit does not travel so far any way as on the wings of poetry; he is the most noted and the most deserving in the whole profession of chirurgery, and has saved the lives of thousands by his manner of

cutting for stone." Curiosity-seeking Nicholls has also another letter, written by Pope to Cheselden.

"Dear Sir,—You know my laconic style. I never forget you. Are you well? I am so. How does Mrs. Cheselden? Had it not been for her, you had been here. Here are three cataracts ripened for you (Mr. Pierce assures me). Don't tell your wife that, * * * Adieu. I don't intend to go to London. Good-night; but answer me. Yours, A. POPE.

" Bath, November 21.

" P.S.—Show this to Mr. Richardson, and let him take it to himself and to his son; he has no wife."

This has reference to Jonathan Richardson, the celebrated painter and writer on art, whose famous portrait of Cheselden adorns the Council Room of the Royal College of Surgeons. The figure is clothed in red, as was the usual custom with this artist. By good fortune Mr. Charles Hawkins saved a splendid engraving of this portrait by Faber, and presented a copy to the Royal Medico-Chirurgical Society.*

In the year 1737 Cheselden was appointed chief surgeon of Chelsea Hospital. He took office in February, and retired from active practice, though he still seems to have operated occasionally for other surgeons. His income from practice is unknown; had it been very large, he would scarcely have accepted the Chelsea appointment. Some of the original shares of old Putney Bridge, of which he is said to have been the architect, were held by him. The bridge has now been removed and replaced.

In 1738 his old pupil, Samuel Sharpe, dedicated to him his treatise on the *Operations of Surgery*, in recognition of his claims as the ornament of his profession; and, in 1742, another grateful patient, in the person of Mr. Wynne, a commoner of Jesus College, Oxford, from whom he had extracted a large stone, blew at him a third poetical effusion, which might have turned the head of a man of weaker cast.

As surgeon-in-chief to the Chelsea Hospital time would now run smoothly with our Cheselden; but he still took an active part in many professional movements, and perhaps most of all in the separation of the Surgeons proper from the Barbers proper, up to

* The Society is also indebted to Mr. Hawkins for the book containing the autograph of Cheselden, which, presented originally to Surgeon Macgill, of Edinburgh, passed through the hands of Prout and Brodie to the learned and generous donor.

his time allied, as one body, in the Barber Surgeons' Company. By the kindness of my good friend, Mr. Shoppee, I have been enabled, from the records of the Company, still preserved in Barbers' Hall, to discover a minute which shows that in 1744 W. Cheselden, Esq., was one of the wardens of the Company. His name stands with those of his colleagues as follows: Jonathan Medley, *barber*, as MASTER; Joseph Sandford, *surgeon*, Humphrie Negus, *barber*, and W. Cheselden, *surgeon*, as WARDENS. Two surgeons and two barbers were, it seems, the Chiefs, by rule, at this period.

Sandford and Cheselden were the two last surgeons who were combined in this alliance. At the time I have specified, 1744-5, the grand separation between surgeons and barbers took place. The surgeons moved over to their new hall in the Old Bailey, while the barbers remained in the old hall as the Barbers' Company, still alive. In the following year, supported by barbers as wardens, Master Jonathan Medley, *barber*, remained at the head of his Company, and Cheselden was seen there no more.

In 1746 our surgeon-in-chief reported the case of a man, aged seventy-six, who was treated for stone by the *lixivium saponis*, or *soap lyes*, made, as I find, from the Pharmacopœia of that day, by adding together equal weights of potash and quicklime with water. In the bladder of this patient, who was a pensioner at Chelsea Hospital, were found 214 stones, varying in size from a pea to a nutmeg, and weighing altogether six ounces two scruples. (*Phil. Trans.*, vol. xlv., p. 36.) About the same period Cheselden operated on a patient for stone who was under the care of Mr. Reid, a surgeon, of Chelsea; and was led in this case to observe, for the first time, that a piece of wetted sponge pushed into a bleeding wound powerfully arrested the loss of blood, and sometimes did away with the necessity for ligature. (*Phil. Trans.*, vol. xlv., p. 33.)

The last important professional work of Cheselden was performed in 1749, and consisted in editing an English edition of the *Operative Surgery* of M. le Dran, with remarks and drawings of instruments. It was well done.

DOMESTIC AND SOCIAL.

Early in his career Cheselden married Deborah Knight, the daughter of a citizen of London. By her he had an only child, Williamina Dorothy, who married Dr. Charles Cotes, M.D., of

Woodcote, Shropshire, sometime M.P. for Tamworth. Mrs. Cotes outlived both her husband and father, and died, without issue, at Greenhithe, in 1763. Mrs. Cheselden outlived them all. She survived until 1764.

Indefatigable Nicholls, rooting out dead gossip, gives us a few anecdotes of our Chirurgeon, which are interesting even in their childishness. Having tied a child up for lithotomy, Cheselden offers it sugar-plums if it does not stir. The operation is performed with so little pain that the patient immediately demands the fulfilment of the agreement.

A friend saying to Cheselden at dinner, that, as he was the best anatomist in England, he ought to be the best carver, he answered, "I am."

In a conversation at Dodsley's, Cheselden remarked to Pope that he wondered at the folly of those who could imagine that the fourth book of the *Dunciad* had the least resemblance in style, wit, humour, or fancy to the first three books. Pope undeceived and mortified him by saying that he himself was, nevertheless, the writer. The same unhappy mistake happened between Mallet and Pope. Between Pope and Cheselden the tie of friendship must have been very strong. In the *Imitations of Horace*, verse 39, we have again a reference to Cheselden from Pope :—

"I'll do what Mead and Cheselden advise,"

while Jonathan Richardson writes to Pope, at Twickenham, after recovering from illness :—

"Cheselden, with candid wile,
Detains his guest ; the ready Lares smile.
Good Chiron so, within his welcome bower,
Received of verse the mild and sacred power,
With anxious skill supplied the best relief,
And healed with balm and sweet discourse his grief."

Rapid and dexterous as he was in the practice of surgery, Cheselden was exquisitely nervous up to the very moment when he commenced to operate. Before operating he was sick from anxiety, and as the moment approached was pale from fear. But the instant he commenced his work all fear vanished, the hand was electrified with skill, and the operation was perfect.

One day a curious bit of gossip found its way to the court, then a centre of gossip. A French surgeon being at St. Thomas' with

Cheselden on operation day, was surprised at what he thought to be weakness on the part of his friend. Afterwards the visitor, induced by his host to go to the fencing-school, in which the host delighted, showed weakness on his part, could not bear the sight, was taken ill, and had to be removed.

On May 7th, 1757, Cheselden sent to the Foundling Hospital £50, enclosed in a paper with the lines from Pope:—

“’Tis what the happy to the unhappy owe,
For what man gives, the gods by him bestow.”

PERSONAL.

Our portrait of Cheselden gives us an admirable idea of the man altogether. He was of nervous lymphatic temperament; a steady worker, and a sound practical thinker; a genial friend; an artist, drawing many of his own plates for his illustrated works; an anatomist; a surgeon, ingeniously mechanical, fairly industrious, and heart and soul in all he undertook to do. Socially, he was a man much beloved, and fond of all things that make life light and joyous.

In the latter part of the year 1751 Cheselden had a paralytic seizure. He recovered, as it was thought, perfectly. On the 10th of April, 1752, being then at Bath, he partook, according to the news of the day, too heartily of ale and hot buns. Finding himself ill, he sent for a physician, who ordered an emetic; the advice was not followed, and the death stroke this time fell sure.

By his own direction, the remains of William Cheselden were laid in the burial ground of Chelsea Hospital; and there, on the north side, was raised this last record:—

“GULIEMUS CHESULDEN,
Natus 19 Octobris, An. Dom. 1688.
Obiit 10 Aprilis, An. Dom. 1752.”

The effects of our Surgeon passed into the possession of his nephew, Colonel Cheselden, who, according to the report current in my young days, died in the early part of this century at Somerby Hall. One of these effects, an oil painting by Panini, was bought at the Colonel's sale by my maternal grandfather, Richard Ward,

and is still in my possession. I remember once seeing Cheselden's professional gown, a case of calculi, and a box of his operating knives, which had also come down from Colonel Cheselden's sale. They were the property of the much-respected landlady of the Three Crowns, Mrs. Bull, long since dead, with, I fear, all her family. A quarter of a century ago, when my first life of Cheselden was in hand, I induced Mr. Henry Hudson, of Somerby, who was then in practice there, to endeavour to obtain these relics for me. He did his best, but without success. I still hope to have the good fortune of finding them, and of placing them in the home where they ought to rest, that Royal College of Surgeons of which their original owner was a Founder and *Primus inter Pares*.

Antonio Scarpa, F.R.S., and Surgical Anatomy

OF the followers of Cheselden, and the school of philosophical study which he founded, no one stands out more famously than Antonio Scarpa, known soon to all anatomical students as the man of Scarpa's space or Scarpa's triangle. It is singular how men who leave a name are often signalised and specialised by some one particular word or saying, perhaps rightly belonging to them, perhaps not. Scarpa, because he more clearly than his predecessors described the triangle formed by the sartorius muscle and the adductor longus, and suggested the operation of tying the femoral artery at the apex of the triangle, that is to say, at the point where the sartorius is just crossing the artery, made for himself a name which will never be forgotten while surgery lasts. This was by no means his best, nor his only practical work ; but it caught the general ear, and there it remains, an unchallenged and fixed phenomenon. In my early days as a teacher, during an examination in physiology, on the subject of the fluid of the membranous labyrinth of the ear, I asked a student the question :

Who was Scarpa ?

And the reply came as fast as it could be spoken, to the amusement of the whole class :

"The man who invented the triangle."

A droll answer, but not the one I wished to obtain ; for I had been at considerable pains, at the lecture which preceded the examination, in impressing on my listeners the great work which Scarpa had performed in his dissections of the ear, and in explaining that after him the fluid now called endolymph was first called *Liquor Scarpæ*. This had escaped notice ; but the triangle, by which the man was known, held its own.

Antonio Scarpa came on the field of life just at the time when Italian science, long the light of the world, had commenced to wane, and just before the victorious armies of the French had entered the Italian states, to ruin them, and itself to culminate and fall with that abortive King of Rome who never mounted the throne. Scarpa was a native of the village of Motta, in Austrian Italy; a little place in what is called the department Friuli, lying to the south of the Tyrol; a mountainous district on its own northern border, but sloping to a plain as it approaches the Adriatic Sea, which forms its southern boundary. His parents were very poor. His birth took place in the year 1746, but on what day I can find no satisfactory record. The year of his birth, indeed, is given differently by nearly every biographer, some making it 1748, others 1750. I select the year 1746, because the Duke of Sussex, when recording the death of Scarpa, from the presidential chair of the Royal Society, in 1832, distinctly gives that date, and fixes his death in his eighty-seventh year, in a strictly official and authoritative form.

Entering into the profession of medicine, and choosing anatomy and surgery as his favourite pursuits, Scarpa rose so rapidly in favour and reputation, that at the age of twenty-two he was elected from Padua, in which he had studied, to the professorship of anatomy in the University of Modena. In Modena, the birth-place of Fallopius, and once a city of Etruscan splendour, he had a home which to a mind classical as well as scientific and practical would present many advantages. After a time he left Modena for purposes of travel, and visited Holland, France, and England. Upon his return his reputation was such that, on the instance of the Emperor Joseph II., he was made professor of anatomy at Pavia, which post he retained until near upon the close of his long and brilliant career, in the thirty-third year of the present century.

The election of Scarpa to the chair at Pavia occurred in 1783, in the thirty-seventh year of his age, and soon, by reason of his new and useful labours as anatomist and surgeon, his name became known in all parts where medicine was cultivated.

The position of professor at the University of Pavia was everything that a man of Scarpa's genius, learning, and taste could desire. The University, one of the oldest, some think the oldest in Italy, tracing its origin from Charlemagne himself, had been for many centuries a grand seat of medical learning. In it anatomy, as a scientific study, had found a centre, perhaps *the* centre of the world. There dissections of the human body were carried on without restriction and



ANTONIO SCARPA, F.R.S.



without superstitious objection ; there a museum of anatomy existed ; and there students flocked from every State to study under the best masters that could be obtained. Over two thousand students would be at the University of Pavia in Scarpa's day ; a majority of these would be in attendance at his classes ; and they, going forth, charged with the light they bore from him, would be the carriers of his name and fame to the nethermost ends of the earth.

Pavia, moreover, was sufficiently large and wealthy to give an eminent practitioner of healing a large and lucrative practice. By its beauty it tempted visitors, and so increased its population. Thus for practice, as well as for professional art, it was a rich field indeed.

To the cultivated mind Pavia presented other treasures. A noble history attached to the place, with a surrounding scenery and a climate that fostered the best faculties of mind and body. To crown all, the professor of anatomy had in his University professional colleagues emulous like himself to stand in the first rank in their departments. Volta was one of these noble and immortal compeers.

Altogether a fortunate start in life was the professorship at Pavia for Antonio Scarpa. Add to this, on his own part, a healthy if not a wealthy parentage, a constitution bearing a charter of excellent health, good for fifty years, and who shall say that our anatomical surgeon was not a fortunate man ?

In the case of such a man as this the poor biographer is to be pitied, rather than the biographified. The biographer finds no events for the interest of his readers. They, with him, can see their hero, or the one whom they and he would call their hero, going day after day and year after year his regular round of labour. The lecture in the early part of the day ; the demonstration in the museum or dissecting room ; the routine of visits to the sick ; the clinique at the hospital ; the surgical performance in the operating theatre ; the night spent in the library, transferring the work of the day into literature intended to flow on when its author lay at rest ; the studies with the artist, engraver, and printer ; the occasional free evenings, when the hours would pass in the society of friends, fellow-professors, advanced students ; hours when the hospitalities would have full play, and the feasts of souls, for which Italy was ever immortal, would have their swing. These scenes, told and retold, will occur to all without further promptings. There let them stand, in pleasant fancy and repose, while more serious descriptions fall from the pen.

SCARPARIAN LABOURS.

The life of Scarpa is eventful only through his labours. He is from the beginning to the end of his career the professor ; his genius, observation ; his force, industry ; his fame, purity ;—purity in exactitude, patience, exposition, initiative, direction. Let us, then, in these works find our next advance in reading the life that lies before us.

On the Nerves of Sense.

Some researches on the nerves of hearing and smelling, *Anatomicæ Disquisitiones de Auditu et Olfactu*, Pavia, 1789, formed the first work of Scarpa which brought him into fame. This work was considered by his cotemporaries as remarkable for the precision with which the descriptions were rendered, and it remained for a long time the standard on the subjects upon which it treated. It is still looked upon as a classical treatise by the curious in science.

Later on Scarpa gave to the world another treatise on the ear, entitled *De Structura Fenestræ Rotundæ, et de Tympano Secundario*. In this memoir he describes the membrane attached to the orifice of the fenestra rotunda, under the name of the second tympanum. He also describes the aqua labyrinthi, giving an account of the fluid of the labyrinth with so much care, that it took his name in many after-essays, by other anatomists, as the Liquor Scarpæ.

On the Nerves of the Heart.

A few years later he issued a new work on the nerves of the heart, under the title, *Tabulæ Neurologicæ ad illustrandam Historiam Cardiacorum Nervorum*, Pavia, 1794. The treatise is the first in which the nerves of the heart itself were properly delineated. Other anatomists had already shown that the bloodvessels of the heart are accompanied by nerves ; but to Scarpa is due the discovery that the muscular structure is also supplied with nerves. Soëmmering had taught that the nerves of the heart were smaller than those of any other organ of the body. Behrens had held that the nerves were destined for the bloodvessels only. Scarpa showed, from his dissections, that the nerves were of the same size and character as those of other muscular organs. The plates accompanying the text are masterpieces, and deserve the compliment paid them by our

own critical Bostock, who says of them that they "may be considered among the best anatomical plates that were ever published. They are admirably expressive of the subject, without the gaudiness of the French engravers, who appear to aim principally at effect ; or the tameness of the English, who seem to think of little else except economy."

The praise thus bestowed on these plates is not one word too strong. They were before me the day before I wrote of them here, and any art of the kind more thoroughly perfect I have never seen. Bostock, always judicious and discriminating, is precise in what he says. There is no gaudiness, no false economy, but there is just what is wanted, nature—the natural outline, shadow, structure. I would recommend every writer who is about to illustrate a work on anatomy or physiology to take a lesson from Scarpa as a preliminary task. Albinus is often admirable, but Scarpa excels Albinus in artistic feeling and descriptive fidelity. The distribution of the nervous filaments, the ganglionic enlargements, the main trunks of the nerves, rendered from dissections most refined in their minuteness and neatness, conveys a much more extensive nervous mechanism than is, I think, commonly assumed as belonging to the heart.

In respect to the influence of the nerves of the heart on the motion of that organ, Scarpa was of opinion that the influence was largely independent of the brain, adducing in support of that view the case of acephalous monsters, in whom the cardiac function may still be actively performed.

On Structure of Bone.

In 1799 Scarpa published a memoir on the structure of bone under the title, *Commentarius de Penitiori Ossium Structura* Leipsic, 1799. The work here named is an exposition of the cellular structure of bone, with some notes on the growth of bones, and on some diseased conditions of bones. The author ventures, also, in this opusculum to speculate on certain points in the chemistry of bone, and on the influence of chemical reagents ; but the leading feature of his argument is that the membranous part of bone is not made up of concentric laminæ—a view which we, in this day, should hardly support. The work was translated into French by M. Lévillé, with an additional essay by Scarpa himself, on the causes and treatment of club foot.

On Aneurism.

Another classical and famous work of the surgical-anatomical order was on the subject of aneurism. It was written in Italian, under the title, *Riflessioni ed Osservazione anatomico-chirurgiche sull' Aneurisma*, Pavia, 1804. The labour was undertaken on the occasion of a question on the subject proposed by the Society of Medicine of Paris in the year 1798. The work is based on the anatomy of aneurism, including a faithful account, in so far as the knowledge of the time permitted, of the structure of aneurismal tumours. The nature of the disease is supplemented by a description of the surgical treatment and of the operations that are required for cure.

On Ligature of the Principal Arteries.

Many years after the publication of the *Treatise on Aneurism*, Scarpa issued a memoir on ligature of the principal arteries: *Memoria sulla Ligatura delle Principale Arterie*. In this memoir, following the experience of one of our own countrymen, Jones, and backing it up by his own experience, he renounced the mode of operation in which the artery is completely closed by the ligature, and substituted the plan of compressing the vessel with the ligature less completely for three or four days only, and after the pressure has excited sufficient inflammation to produce closure of the vessel, of removing the ligature altogether. The mode of carrying out this removal he described in 1823 in a letter, with one plate, addressed to Dr. Omodei, on temporary ligature of the great arteries. *Sulla Ligatura Temporaria delle Grosse Arterie degli Arti*, Milan, 1823.

On Hernia.

In 1809-10 Scarpa brought forth a treatise on Hernia, *Sull' Ernie Memorie Anatomico-chirurgiche*, Milan, 1809-10. This treatise, essentially of a practical kind, although, as usual, illustrated anatomically, passed through many editions, and was translated into the French and other tongues. The work continued to hold its own for many years, and was republished, revised from its previous editions, in Paris, in 1823, turned into French by M. Ollivier.

On Perinæal Hernia.

As a supplement to the edition of the work on hernia edited by Ollivier, but published, likewise, in a separate form, was an essay

on perinæal hernia, *Sull' Ernie del Perineo*. In some respects this essay was a novelty in surgery. The statement that there might be hernia through the perinæum had been made before Scarpa's time, but had not been generally accepted. Dessault had denied it altogether, and Astley Cooper, while conceding that a portion of intestine might be pushed down very low in the pelvis, so as to rest on the perinæum, would not admit that it could ever protrude there so as to form a true hernial tumour *in perineo*. Scarpa settled this controversy by showing, from direct observation, that Chardenon, the first surgeon who had described the rare phenomenon, was correct. Scarpa had for some years under his care a patient who suffered from a reducible hernia in the perinæum, for which hernia he devised a truss that answered well. The patient ultimately died from phthisis pulmonalis, and our anatomist seized the opportunity of a *post mortem* to inquire into the nature of the hernial sac. His dissections, carried out with extreme care, and illustrated by five engravings, proved that there may be a hernia of the intestine to which the term perinæal hernia is rightfully and scientifically applicable.

Diseases of the Eyes.

Between the years 1801 and 1816 Scarpa presented six editions of a treatise on diseases of the eyes. The original title was *Saggio di Osservazioni ed Esperienze sulle Principali Malattie degli Occhi* Pavia, 1801-16. In 1806 this work was translated into English by a surgeon named James Briggs, a member of the College of Surgeons, and assistant-surgeon to the Public Dispensary, and was published by Cadell and Davies, of the Strand. Briggs, who lived in the Edgware Road, London, seems to have had a good knowledge of the Italian tongue, and to have been on terms of friendly communication with Scarpa. He was also a friend of one of our own very eminent but now forgotten London surgeons, John Pearson, F.R.S., the Junior Surgeon of the Lock Hospital, and of the Institution for the Investigation of Cancer; an observer of great power, and an original thinker. To Pearson the translation was dedicated by the translator. The volume consists of 536 pages, and contains three sets of plates, the last series of much interest, as showing the instruments used by Scarpa in his ophthalmic operations.

The preface to this book by the author is boldly singular in vindicating that the surgery of the eye belongs to the domain of general

surgery, and is no mere section of surgery. "Professed oculists," he says, "who have entirely devoted themselves to this department, and from whom great and important improvements might justly have been expected, have only contributed new theories, which, for the most part, have been disproved by a minute anatomical investigation of the eye, or have merely furnished histories of cures little less than miraculous."

In the practical portions of this work Scarpa revived the old operation for cataract by *depression*, as opposed to *extraction*, of the crystalline lens; not only because depression is more easily executed than extraction, and can be equally employed in every species of cataract, whether crystalline or membranous, solid or fluid; but because depression is attended with symptoms far less violent and dangerous than those which frequently happen after extraction; and because, if from any accident this operation should occasionally prove unsuccessful, it may be repeated two or three times upon the same eye without any risk; a circumstance which *extraction* does not admit of when that operation has not had the desired success.

The instructions for the operation of depression are few and simple. For hard cataract the operator is to push the lens well under the vitreous humour, taking great care to dispose also of the capsule that there may be no formation of "secondary membranous cataract." If the cataract prove to be of the milky character, the surgeon is not to lose his presence of mind at seeing a whitish milky fluid issue from the capsule, diffuse into and through both chambers of the aqueous humour, and obscure the pupil and the whole of the eye; but he must make sure of breaking up the capsule in order to avoid membranous cataract. The milky fluid will, he may be sure, all be absorbed in a few days, spontaneously, and permit the pupil and the whole of the eye to resume their natural brightness. If the cataract turn out to be soft or cheesy, the capsule is to be thoroughly lacerated, and the cheesy molecules, well broken up, are to be thrust with the needle through the pupil into the aqueous chamber, in order that they may not be carried opposite the pupil, but being situated at the bottom of the anterior chamber, may be gradually dissolved and absorbed without obstructing the sight.

In another chapter Scarpa describes a new method which he invented for making an artificial pupil when that is required. He gives to Cheselden the credit of first suggesting and practising the operation for artificial pupil, while he claims for himself a useful modification of the method, which consists in separating the outer

edge of the iris from the ciliary ligament for a certain extent without previously dividing the cornea. The details of the operation are supplied with such minuteness, that to read the account is almost to see the operation performed. On the whole, it seems to have turned out a successful procedure.

Another chapter is devoted to the treatment of dropsy of the eyeball, and is well worth perusal. In the early stages of dropsy he has, he tells us, sometimes succeeded in quieting the uneasy sense of distention by a seton in the neck, but as soon as the eyeball begins to protrude from the orbit, there is nothing to prevent the extension of the disease except an operation, "which consists in evacuating the superabundant humours of the eye, by means of an incision, and thereby obliging its membranes, in consequence of a mild inflammation and suppuration of the internal parts of the eye, to contract of themselves and retire to the bottom of the orbit."

The operation proposed and practised by Scarpa for the relief of dropsy of the eyeball consisted in piercing the cornea, with the small knife, a line and a half from its summit or centre, in passing the instrument from one canthus of the eye to the other and dividing the cornea downwards in the form of a semicircle, in raising this segment with the forceps, and, turning the cutting edge of the knife upwards, completing the operation by removing a circular portion of the centre of the cornea, of the size of a large lentil seed, or three lines in diameter in the case of an adult. Through this opening, with gentle pressure, he forced out so much of the superabundant fluids, as to allow the diminished eyeball to re-enter the orbit, and be covered by the eyelids. The remaining fluids were allowed to escape of themselves, and the inflammation and suppuration that followed caused such destruction, with ultimate contraction of the eyeball, as to allow an artificial eye to be worn easily.

The volume closes with the record of a case of calculous concretion of the internal part of the eye.

On Scirrhus and Cancer.

A memoir on scirrhus and cancer, by the industrious Italian professor, under the title, *Memoria sullo Scirro e sul Cancro*, in the *Transactions of the Imperial Institute of Milan*, 1822, maintained in a signal degree his grand reputation. This memoir seems to have met with a hearty reception in England, owing to a literal translation of it, also by Mr. James Briggs. As the arguments advanced in this

essay refer to many points which are still under discussion in our learned societies, I shall bestow on it a little extra attention.

Scarpa, then, advocates, in the treatise now before us, the view of the local origin of cancer, and from this view tenders the opinion that it is vain to expect to find a specific remedy for scirrhus, and as vain to entertain an expectation of the restitution of a cancerous structure, as it would be of an encysted tumour, or an opaque crystalline lens. The science of treatment in cases of cancer turns, therefore, on the answer to one decisive practical question: What is the precise period when the diseased structure may be removed with the best chances or assurances of success?

Another point which he insists on is that cancer is never formed except from legitimate scirrhus affecting some of the external conglomerate glands, or from warts or malignant tubercles of the reflected skin, partaking of the nature of scirrhus. He holds that cancer is, exclusively, a cutaneous disease: it never primarily affects the lymphatic system, nor the absorbent glands, nor the mucous glands, nor the viscera, except in those internal parts which possess an extension or reflection from the skin direct in kind, as the pharynx, the esophagus, the stomach, the rectum, the vagina, and the cervix of the uterus. Even in respect to uterine cancer he affirms that it never occurs except from the ulceration of small scirrhus masses or elevations which are formed upon the reflection of skin investing the upper part of the vagina and the cervix. In all the records of surgery he declares there is no well-authenticated case of cancer of the uterus arising from any other part of the uterine surface or uterine structure.

What we now call medullary cancer, and other forms of the disease affecting visceral organs, Scarpa would not admit to be cancer at all in his sense of the term. To his mind hardness of structure is, as the name implies, the distinguishing sign of scirrhus or true cancer, which he defines as a disease of advanced or middle age in persons of a bilious, sanguine temperament—in whom there is no scrofula; and which he describes, diagnostically, as a growth excessively hard and indolent, increasing slowly in every direction, and retaining its insensibility until it degenerates absolutely into cancer. These characters distinguish scirrhus from scrofulous tumours, from swellings of conglomerate glands, and from medullary tumours, which have their origin in subcutaneous or intermuscular textures.

Scarpa denies that any hard chronic or indolent swelling may from lapse of time change into cancer. Cancer is local, but it is also

specific, in the sense that it must be founded on a predisposition. At the same time he questions the existence of a scirrhus diathesis, for two reasons: firstly, that scirrhus is an isolated disease; secondly, that if a scirrhus tumour be removed before it has degenerated into cancer, it is radically cured. This idea of predisposition to the disease, minus diathesis, may seem a paradox; and, indeed, it has been raised against Scarpa as a writer that he was given to paradox. I do not, however, think that the charge would in this instance be fair; for, as he puts it, there is between predisposition and diathesis a difference which admits of application far beyond the range of cancer, and extending into the range of all disease. The idea is, in short, one of those flashes which no one but one who has the eye of genius suggests, and which, like a passage from a Dante or a Shakespeare, is penned by a man unconscious of his own inspiration.

There is always, if I read the Scarparian idea correctly, predisposition to cancer in those whom it attacks; but the predisposition may be due to internal elaboration from and in the individual himself. The disease is the deposition of a centre or seed of a more formidable character than the scirrhus itself. This is by virtue of the predisposition, which may have descended from ancestry, but which may also have developed in the person affected. The centre laid, the exciting cause alone is required to bring out the malady. But the exciting cause is no more than *occasional*; it may be suppression of the menstrual flux in women, of hæmorrhoidal flux in men; it may be external violence; deep and long-continued grief; the abuse of venery or such-like—a cause, in short, which may affect any one, but which will not bring forth cancer except in the predisposed. Thus, the *efficient* cause of the disease is to be traced to no other source than that of natural elaboration to which every individual is, more or less, or in no measure, predisposed, although exposed to the same occasional exciting causes.*

Summing up the diagnosis of scirrhus, Scarpa defines the glandular form as: a disease of advanced or middle age, attacking most frequently the bilious-sanguine; a solitary affection; excessively hard and indolent; insensible, notwithstanding its increase in size,

* The above, as far as I have been able to follow him, is a fair representation of the mind of Scarpa, on the development of scirrhus. I would, however, that some English scholar and surgeon, a master of all the refinements of the Italian language, and possessing also a matured experience of the disease in question, should reproduce this remarkable memoir, with fitting comments, in an English dress.

until it degenerates into the second or latent stage of cancer, attended with pruritus, a sense of burning heat, and darting pains, not increased by pressure. Scirrhus warts and tubercles are, he says, to be judged of from their universal rigidity and harshness; from their being derived of their natural integument; from the size and depth of their base; from their yellowish livid or dark colour, surrounded by a red circle; from their rapid and almost sudden growth; from the intolerable pruritus excited by them; and from the fissures which are formed in them, from which there is occasional slight discharge of yellowish acrid serum, preceded by darting pains.

Of treatment Scarpa speaks authoritatively from experience, and briefly from decision based on knowledge. What he inculcates is summed up in five words, in respect to glandular scirrhus: *Operate in the first stage*. In his long practice he only succeeded three times after extirpation in genuine scirrhus, and those were cases in which he was so fortunate as to operate before the occurrence of pruritus, heat, and lanciolating pain. In respect to warts and minor growths on the skin, he would give more liberty as to period of growth, but with them delay is also dangerous.

Minor Works.

In addition to the larger works named above, Scarpa contributed many minor essays: *On the Cutting Gorget of Hawkins, and Remarks on the Lateral Operation for Stone*, translated by Briggs, 1816. *On the Anatomy and Pathology of the Bones*, 1827. *On Hydrocele of the Spermatic Cord*, Pavia, 1823. *Observations on Recto-vesical Cutting for the Extraction of Stone from the Urinary Bladder*, 1823. Letter to the Cavalier Luigi Bossi *On a Helmet of Iron Exquisitely engraved*, Pavia, 1816: with other artistic and literary letters and memoirs.

THE SCHOLAR AND MAN OF FAME.

We have seen Scarpa so far as the Professor, the Surgeon, and the Author. Let us, for a few moments, turn to him as the scholar and man of fame.

The fine portrait of Scarpa which accompanies this biography, and which is from the life, tells us, beyond any verbal description, the character of the man. A man of spare build and powerful frame,

lithe, active, enduring, with a face of resolve, determination in every feature. The lips firm set, compressed, resolute; the nose well-formed and strongly set; the eyes like those of an eagle, microscopic, telescopic, from which nothing in the range of unaided vision could escape; a head of the keen perceptive build. A face like that of our Horatio Nelson, who, had it fallen to him to be professor of anatomy at Pavia instead of victor of Trafalgar, had been a Scarpa.

It were difficult to imagine any sick person doubting Scarpa. Look at him and live, or die. His very portrait, to this day, speaks.* Doubt me if you dare. The full determination of this man in all he undertook; the resolve to persevere in what he had begun, without the intervention of any timid faculty of reason, when reason is past being useful, seem ever to have been present in him, as a single incident will show.

He was operating one day for cataract in the practical school of Pavia, and in the presence of a goodly number of students, when an untoward accident occurred. The straight needle, with which he was effecting the depression of the cataract, being made of bad tempered steel, bent into the form of a *small hook* as it was piercing a very firm sclerotic coat. This he perceived as soon as the instrument appeared between the pupil and the capsule of the crystalline lens. Instead of being perplexed, however, he proceeded with the operation, and having pushed the point of the small hook through the capsule into the fine substance of the lens, he removed both from the axis of vision with the greatest facility, and afterwards withdrew the needle from the eyeball without producing any laceration. From the accident, thus coolly met, he gathered an experience. He considered that the curve or hook in the needle was an advantage, and from that time used for depression a curved instead of a straight needle.

He was happy, owing to this keenness of perception, in seeing what at first were minor, but afterwards became major, points of practice. The description of the anatomical triangle, which bears his name, and of the ligature of the femoral at the apex of that triangle, was one of those little great advances which distinguish men of his class. Some French writers give to their distinguished surgeon Anel the credit of first tying the femoral artery for the cure of popliteal

* For the portrait I am indebted to my good friend Mr. George Brown. Endow it with compassion in place of sternness, remove the peruke, and it might pass for the portrait of our greatest living surgeon.

aneurism ; some English writers give the credit to John Hunter ; but the common consent is to give the credit to Scarpa, not because he deserves it, for it belongs to Anel, but because he defined a point for the operation, from which the *magister chirurgiæ* cannot easily err.

As the name of Scarpa became widely known, honours flowed in upon him from all quarters. He was elected a member of the Royal Institute of Literature, Science, and Art, of the Lombardo-Venetian Kingdom ; a Foreign Associate of the Academy of Sciences of Paris ; a Chevalier of the Legion of Honour ; a Chevalier of the Imperial Order of Leopold ; and a Fellow, on the foreign list, of the Royal Society, elected on the 5th of May, 1791, the President, Sir Joseph Banks, in the chair. The minute of election runs as follows :—

“This being the meeting appointed by the statutes for filling up the vacancies in the foreign list, and the number of the candidates being equal to that of the vacancies, the following were, without any previous selection, put to the ballot, viz., M. de la Grange, Member of the Royal Academies of Sciences of Paris, Berlin, etc. ; Signor Alessandro Volta, Professor of Experimental Philosophy in the University of Pavia ; Antonio Scarpa, Professor of Anatomy in the same University ; Marc Augustus Pictet, Professor of Natural Philosophy at Geneva ; M. de Lambre, of Paris ; and M. L'Huitier, of Geneva. They were all chosen Fellows of the Society on the Foreign List.”

THE LAST CHAPTER.

Up to his sixty-sixth year, Scarpa continued to hold the chair of anatomy at Pavia. Then, his health beginning to decline from age and work, he retired from the professorship, to take the honourable, yet still responsible post, of Rector of the Medical Faculty of Pavia. He held this post with great distinction. He was sufficiently wealthy to retire from active professional labour, to live in comparative splendour, and to hold himself at liberty to follow his likings for the study of agriculture, collection of works of art, and cultivation of the friendships of the chosen spirits that were nearest to him in taste, disposition, and culture.

In his last years, he who helped to restore so many to sight temporarily lost, himself became blind, and on October 30th, 1832, during an attack of inflammation of the bladder, at Pavia, he went his way, *ad divinum animorum concilium cætumque*.

The death of Scarpa was most delicately noticed by the Duke of Sussex, as President of the Royal Society, on November 30th, 1832. He said that of foreign members the society had to record the deaths of Cuvier and Chaptal in France, of the Baron de Zach in Germany, and of Oriani and Scarpa in Italy. To Scarpa the Duke paid a warm tribute.

"Antonio Scarpa, one of the eight foreign members of the Académie des Sciences of Paris, and probably the most profound anatomist of the present age, was born in the year 1746, and died in October last in his eighty-seventh year. He was made professor of anatomy in the 22nd year of his age, and for the last half-century he has been placed by the common consent of his countrymen at the head of their anatomists and surgeons. He was the author of magnificent and classical works on the organs of hearing and smell, on the nerves, on the principal diseases of the eye, on aneurism, on hernia, with memoirs on many other subjects of physiology and practical surgery. He had accumulated a handsome fortune by the practice of his profession, and had collected in his palace at Pavia a considerable number of works of art, where he lived for the latter years of his life surrounded by his pupils, revered by his countrymen, and in the enjoyment and contemplation of that brilliant reputation, the full development of which a great man can rarely live to witness."

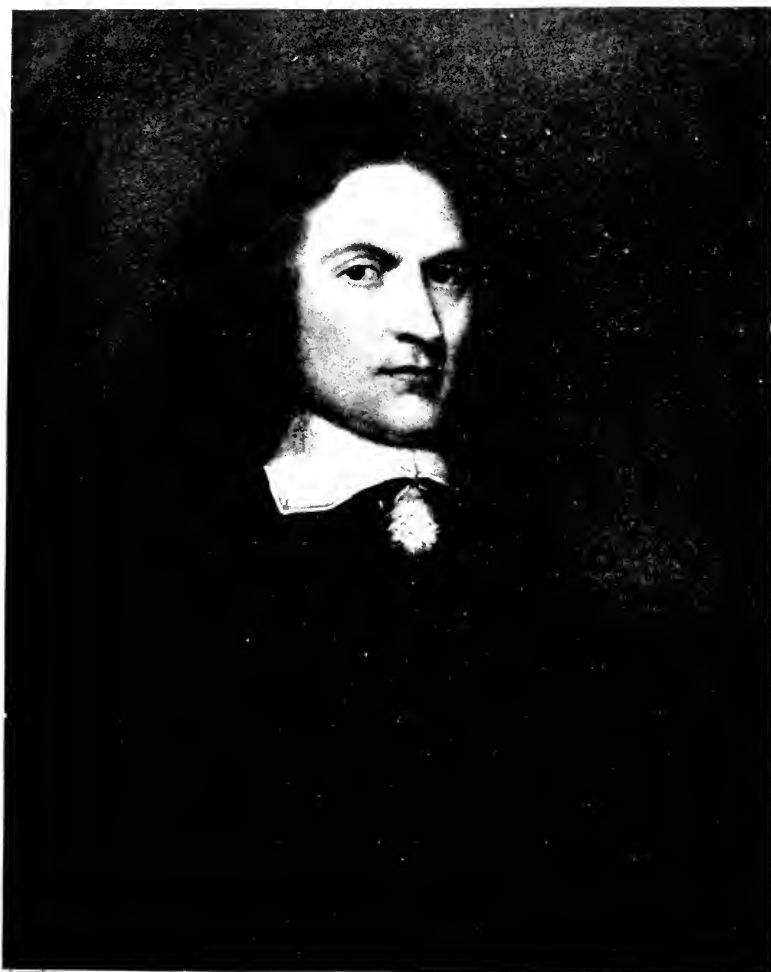
A truly princely epitaph from a prince amongst men to a prince of the Divine Art.

Richard Wiseman and the Surgery of the Commonwealth

THAT surnames sometimes convey the character of their owners, as if the name at its origin was the natural expression of observing neighbours and friends, is beyond dispute. In the man who comes before us as one of the surgeons who lived through and after the Commonwealth of England, the fact is well illustrated. Richard Wiseman, the surgeon referred to, was a wise man in deed as well as in name.

Richard Wiseman first appeared as a surgeon in the Civil Wars during the reign of Charles the First. He accompanied Prince Charles, afterwards Charles the Second, in his roving through Holland, France, and Flanders. He was present at the battle of Worcester, was taken prisoner, was soon liberated, came to London in 1652, acted first as an assistant to Mr. Edward Molin, and afterwards practised on his own account. On the Restoration, he was made Sergeant-Surgeon to the king; and on May 24th, 1676, published his *Chirurgical Treatises*, having, as he says in the Preface, "made a vertue of necessity, and employed those hours for the publick service, which a frequently-repeated sickness for the twenty years last past denied him the use of in his private occasion;" so that it "pleased God, by casting him into such a condition, to give him opportunities of thinking as well as practising."

Such are the few biographical notes which have been gathered regarding Wiseman. One or two more facts I have myself dug out of his own works. He attended the king, Charles the Second, at the Hague, and was with the court at St. Johnstone's, in Scotland. When serving in the Civil Wars he was under Sir Alexander Fraser, chief physician to the first Charles. He lived at one time, early, perchance, in his career, in the Old Bailey, and had a kinsman named



RICHARD WISEMAN,
SERGEANT-SURGEON TO CHARLES II

From an oil painting in the possession of the Royal College of Surgeons of England.



Jacques Wiseman, who seems to have been an assistant to him in important operations.

But, although the minutæ of Wiseman's daily life are not before us, we fortunately retain his published writings, and from these may extract many facts, which not only serve to indicate the character of the man, but also the state and condition of surgical science and art at the time he wrote and practised. It is well for us, too, in this respect, that his writings are not confined to one or two particular points. They embrace the greater part of the chirurgical learning of his day, and are told by one who was regarded as a renowned practical authority during his life ; while long after his demise his book, looked on by young chirurgeons as the standard for learners, was regarded by older men as the standard for reference.

The labours of this master were collected in one volume, bearing the title, *Several Chirurgical Treatises*. They were published by Benj. Tooke and Luke Meredith, at the "Star," St. Paul's Church-yard, and at Middle Temple Gate, Fleet Street. The epistle to the reader, signed by the author, bears date May 24th, 1676.

It has been customary to look upon the reign of Charles the Second as a backward or receding period in science in which, as Hume observed, "the king rendered his reign a misfortune to the kingdom and entailed upon himself the contempt of all the other powers of Europe." Notwithstanding, it is a libel to say that the age of Charles was wanting of scientific talent. In this reign the Royal Society had its infancy cherished, and during it many men of medicine of original cast lived and laboured. Biggs, who wrote so well on the structure of the eye ; Sydenham of immortal works ; Willis, whose essays on fermentation in diseases of the febrile class and whose anatomy of the brain are still so much prized ; Sir C. Scarborough, whose introduction of the geometrical and mechanical sciences into the study of anatomy—these alone mark the period to which Wiseman added his useful share.

What one present in the age itself thought of its scientific position, in relation to surgery, is supplied in Wiseman's Preface in a few notes which indicate his feelings and views. Speaking of his own works, he says, in regard to the novelties he has introduced, that "such ancient practitioners as are unwilling to be now learning a new lesson, will be angry that those definitions and descriptions, and sometimes methods of cure, are needed, from which they learned when young ; those being the basis on which they have built the whole superstructure of their practice." To these, therefore, he does

not address himself, but "to younger men who have their principles and practice yet to choose." "Others," he continues, "wholly taken up *with the novelties wherewith the age aboundeth*, will be angry that all new notions are not here pursued to nicety, and many little anatomical and chemical punctilios inserted and brought in on all occasions, instead of the old way of expressing the accidents of diseases, with their causes and cure. I would have these men consider," says he, "that I am a practiser, not an academick; that I delight in those things as far as they are useful to life, but have thought it too great a digression from my present purpose to stuff up a practical book with such philosophical curiosities, which become it just as well as it would become a divine to fill a practical discourse with school distinctions." A little further on Wiseman laments the inaptness of the theory as applied to the practice of disease. "When," he remarks, "the young chirurgeon shall find the cure easie in theory, and appear so at first in the practice too, yet suddenly deceive him with a relapse, and not only once, but often delude his best endeavours; when the bystanders and persons concerned shall begin to accuse him of knavery in his proceedings, and think him to pull back a cure, whilst he is rolling Sysiphus his stone, which will tumble down whether he will or not; he will then wish that all other practitioners had done what I have done in this treatise, viz., recommend their observations, both successful and unsuccessful, thereby increasing knowledge in our profession, and leaving seamarks for the discovery of such rocks as they themselves have split upon."

In the few passages here quoted the reader will gain a fair knowledge of the character of Wiseman—a man of practice at every turn, conservative, yet liberal withal, and given to the observation of nature. Such men are always useful, and always make their way; they may not light on great discoveries, for their timorousness in thought and their hard fact propensities prevent this accomplishment; they, nevertheless, lay the basis on which after-discovery rests. They see as far as all is clear, and they chronicle what they have seen faithfully. If they do more, they do wrong, and wander even into wilder speculations than they whose cast of mind leads exclusively into difficult and original inquiries.

Wiseman's volume is made up of eight treatises. The first is on tumours; the second on ulcers; the third on diseases of the anus; the fourth on the King's-Evil; the fifth on wounds; the sixth on gun-shot wounds; the seventh on fractures and luxations; the eighth on lues venerea.

ON TUMOURS AND ON THE TREATMENT OF VARIX, ANEURISM,
AND CANCER.

Wiseman defines a tumour after Galen, viz., as "a disease in which the parts of the body recede from their natural state by an undue increase of their bigness." Respecting the causes of tumours, he considers them according to their time and place, and thus calls them: "1, antecedent; 2, conjunct. The antecedent cause is that which has not actually produced a tumour, but is thoroughly mixed with the blood, or otherwise lodged in some convenient place where it is not troublesome to nature, at least to the part, though, if not prevented, it does produce the feared effect." Of this sort of causes he reckons all impurities in the blood which do not start out into the solid parts; as the matter of an erysipelas, phlegmon, parotis, and bubo, before a crisis is made; so also any tumour in the body which, lying in any part of it, is apt to be translated to another. By a conjunct cause he means the very matter of the tumour that is already impacted into the part, upon the increase of which the tumour increases, and on the diminution of which it diminishes.

In regard to the matter of which a tumour may consist, he attributes it originally "to humour; to wind, as in emphysema; to interposition of a solid body, as in hernia; and, to blood itself, as in varix, ecchymosis, and aneurism. In respect to treatment he often edged upon quite modern methods which he knew, whether he used or discarded them.

TREATMENT OF VARIX.

Speaking of varix and its treatment, he teaches that "varices ought not to be cured, unless they be painful and extend into a large tumour, or ulcerate and bleed much, for they preserve health. But, if there be a necessity of curing them, it ought to be begun with purging and bleeding, not once or twice, but often repeated; and if the viscera be in fault, they ought to be strengthened and amended; after which the cure may be endeavoured by astringent and exsiccant medicaments, applied with convenient bandages to press back the blood coagulating in the vessel, and moderately to resist the current. If these suffice not, then, according to the ancient practice, you are to proceed by section, dividing the skin and separating the integuments; then, having raised the varicose vein, you are to pass a ligature above and another beneath it,

making a deligation of them ; then slit the vein, cast out the gross blood, and afterwards digest and heal up. In my practice," he says, "I met many diseased with varicose swellings, but I never met with one patient that cared to hear of the cure by ligature ; nor, indeed, have I seen any great reason for it. For if the unsightliness and pain be in the legs, it may be helped by wearing a laced stocking, and placing a card, a piece of vellum, or a bit of beaten lead between them. A laced trowze will do much for the thigh. When they affect the belly they may be restrained by a bracer. The cure of hernia varicosa is by a good bandage, viz., a bag-truss."

TREATMENT OF ANEURISM.

Respecting aneurism he observes : "An aneurism is an ecchymosis, and, indeed, the highest species of it. It is raised, according to the opinion of authors, by dilatation or relaxation of the artery ; they supposing the blood to have burst its passage through the first coat, and dilated the second, thereby raising the tumour. I am apt to believe that there is no such thing, but that it takes its rise from blood bursting quite through the artery into the interstices of the muscles, where it raiseth a tumour suitable to the cavity it findeth. But this tumour consisteth of blood extravasated, the artery lying undilated all the while."

That Wiseman here committed a great practical mistake is obvious enough. He was, perhaps, misled by the circumstance of having met with cases of external dissecting aneurism. In regard to his treatment of aneurismal tumours, some of it is dismal enough. Compression of the tumour, the application of unguents, bleeding in urgent cases, opening the tumour, and applying after-dressings that the wound might digest. In one remarkable case, he tied the artery. A man was affected with an aneurism of the right arm occasioned by phlebotomy. Some proposed to amputate, as the tumour was large, much inflamed, and painful. There were three other surgeons in attendance, Mr. Arris, Mr. Hollier, and Mr. Gardner. Wiseman proposed amputation, or deligation of the artery. The deligation was decided on. Four days after, all the surgeons met ; the patient was placed in a chair towards the light. Wiseman removed the dressings, and made a ligature four fingers' breadth above the tumour, on which Mr. Hollier made a grip. Some others held the hand and lower part of the arm. Wiseman then made an incision down the length of the tumour.

That done he drew out the grumous blood with his fingers, and cleaned the wound with a sponge. Then desiring Mr. Hollier to slacken his hand, upon which the artery discovered itself by the blood spouting out, he, Wiseman, passed a needle under the upper part of the artery, tied that, and cut off the end of the ligature. Near the wound made in the artery by the letting of blood there a cartilaginous body was formed, which hindered his coming to the artery. He, therefore, cut it away, passed his needle, and made a second ligature. He then dressed the wound with pledgets spread with common digestive "*ex. terebinth. dipt in pulv. Galeni*," applied "*empl. diachal.* malaxed with *ol. ros.*," and "rowled it up to the ease of the patient." Upon that the patient was put to bed and had anodyne draught. He slept well. The third day after, the dressings were removed, and all was found safe; "the lips of the wound tending to digestion." From that time the wound was dressed with sarcoticks, the loose flesh was rubbed with vitriol stone, and the cicatrising was hastened with "*aq. medicamentof.*" Wiseman attended until the ligatures fell off, then left the wound to the family surgeon. The patient did well and recovered the full use of his arm. This method of treating aneurism precedes not John Hunter's only, but that of Anel, of which our French confrères are naturally and properly proud.

TREATMENT OF CANCER.

On the treatment of cancer Wiseman followed three intentions. His first intention was the generation of good blood by attention to diet. The second was the correcting of the "atrabilious humours," by purging, venesection, or blood-letting. The third consisted in preventing the growth of the tumour, and disposing it to dispersion.

This last-named intention was to be done with care. Cancer is to be "moderately discussed." While the tumours are evacuating, mild "repellants" are to be applied, and afterwards "discutients." All the unguents prescribed ought to be beaten in a leaden mortar. "Lead beaten into thin lamina is usually worn in these cases, so is gold after the same manner." "The oyl of frogs is commended, and is made by baking frogs with butter in their mouths." "Frog-spawn water is of good use in the summer if cloaths be dipped in it and applied; but they ought to be shifted as they dry and fresh ones applied." In winter, lest the patient take cold from this application, Wiseman recommends an elaborate cerate.

Let us pass to the manner in which our sergeant-surgeon removed cancer by operation.

That the operation might be done with success, Wiseman proposed the three following rules: First, that the patient be of a strong constitution, and of a tolerably good habit of body, and not in a declining age, and, in women, when the menstrea have ceased. Secondly, that the cancer be loose, and the axilla free from painful glands; it were to be wished, also, that the cancer took its "original" from some accident, as a bruise. Thirdly, that the operation be performed in the spring or autumn of the year.

Wiseman, in this part of his instructions, attacks the empirics of his time, and speaks of a certain nostrum called "Mathew's pill," which seems to have been celebrated in its day as a quack specific. He objected generally to escharotic medicaments, but approved of the actual cautery, which should not be applied lightly upon the upper parts, but by thrusting it at "the root" with a scoop or chisel-like cautery, carrying it away direct. If there remain any "rags" of it, with a proportionate button cautery burn down to a "crust."

The practice of the cautery is illustrated by Wiseman in glowing terms. Some of his cases seem to have done well for a time. The coolness with which the operation was performed is inimitable. A man, fifty years old, in whom cancer of the upper jaw had been excited by the cracking of an apricot stone, was operated on. While various implements for burning were being forged, such as chisels and bolts, the patient was let blood, purged, and "prepared for the work." When operation time came, the instrument maker was there to heat the cauteries, and mend or alter them, as occasion should offer. One of the assistants then held the head and upper lip of the patient, whilst Wiseman, depressing the tongue with a *speculum oris* with the one hand, placed with the other a plain chisel cautery just under the upper lip into the body of that part of the cancer which stretched itself along the roof of the mouth into the palate, and repeated the use of that fashioned cautery until he had made a separation of so much. The carrying of the cautery thus was the way to preserve the sound parts from being scorched from the reflection of the glowing iron. "*It was also a great encouragement to the patient to see such gobbets burnt off with so little pain.*" At last, after cutting and burning through the alveoli, "which were as rotten as dirt," the patient grew weary, and the physician thought enough was done for that time. Next day, and some following days, this process was repeated, the surgeon

"drying and smoothing his work." At last a cure was effected in the space of six weeks, with a firm and smooth cicatrix. Incredulous Dr. Bate hereupon whispered to Sir Francis Prujeau "that it would not hold a month." "But it held seven years, or thereabouts," says Wiseman. Others who at the first consultation had declared it an incurable cancer, now declared amongst their companions that it was no cancer. In the year 1668 the disease broke out again in this man after fever. The throat was now attacked, and he languished and died.

In one of his operations on the breast, where that organ was removed by the knife, Wiseman tried an experiment with the "Royal Styptic Liquor,"* which was given him the morning before by His Majesty's special command. Two arteries bled forcibly out, till Dr. Needham applied a lint button wet with the styptic on one, and Jacques Wiseman on the other. The doctors stopped the bleeding instantly, and the compress adhered to it; but blood dribbled from the other till the application of another button, when that also stopped. Afterwards, the patient having vomited, one of the arteries burst out bleeding again. A re-application of the styptic stopped it; but Wiseman was not quite happy, and, it being night, gave the vessel an extra seal down with the point of his button cautery.

By whatever way he removed cancer, it was the point with him to operate while the disease was recent. In later stages he clung to palliative measures merely, although sometimes attempting even then the radical cure, either at the request of the patients themselves, or by the authority of a consultation of eminent physicians and surgeons.

TREATMENT OF DROPSIES.

In Wiseman's time the common trocar and canula seem to have been unknown. Barbett, he says, had lately published the use of a hollow needle. "The repeated intrusion of this into the same or into fresh holes, say he and Sylvius, will evacuate water at your pleasure." Wiseman tried this needle, with Mr. Hollier, in ascites, but objected to it on the ground of the injury that might be done to the intestines as the body collapsed. He concluded that the best

* This styptic, the composition of which is not given, was of French invention. The account of its introduction is described in the eighth volume of the *Royal Transactions*.

plan of treatment was the old plan of a canula made taperwise with holes in the side, which, being conveyed through a hole made by a puncture, may be kept in till all the water flows out. From one case which he describes it appears that he introduced his canula "three fingers width below the navel"; that he drew off the fluid in small quantities at a time, and that he left the canula in the wound so long as he was inclined to evacuate the fluid.

In cases of anasarca he seems to have trusted mainly to firm bandaging and the use of brisk purgatives. In one instance, when he was attending the king at St. Johnstone's, being called to a man with a swelling of the scrotum, which he thought was hydrocele, he made an eschar with a caustic on one side, and afterwards opened the other side by incision. The man recovered. In other cases he scarified for hydrocele. In hydrocephalic cases he teaches that, if the swelling proceed from effusion external to the cranium, it may be opened; but if it proceeds from within, he suggests that it be let alone. Children with hydrocephalic heads he holds to be of unsound constitution, rachitic, and scrofulous.

THE TREATMENT OF HERNIA.

In order to cure hernia it is necessary, Wiseman taught, to consider whether the hernia be intestinal or omental, recent or of long continuance, made by relaxation or ruption. He digresses to give an account of trusses. Bag trusses are recommended; they were made by Mr. Syms, in "Bell-ally, near Temple Bar." There were also trusses made of whalebone, others of thin laminæ of tin and steel; and these were made by Mr. Smith, a Scotchman, who lived near Fleet-bridge—the most ingenious man in that work, and who made "the best trusses for retaining umbilical hernia."

"The same Mr. Smith," says Wiseman, "also invented an engine, by which he sets persons on their heads who were suffering from hernia difficult of reduction, and thereby reduced many which could not otherwise be relieved." Wiseman approves of this, and explains that if the plans already mentioned fail it is necessary to consider what the impediment is, and proceed accordingly to let blood, purge, or vomit, or put the patient into a semicupium, keeping on the bag truss the while, after which he may, if occasion require, be carried to and fro upon the back of a strong man, with his head downwards, by which the prolapsed bowels are often reduced.

Where the hernia is down and irreducible, and the patient is

threatened with vomitings and inflation of the abdomen, Wiseman is for early operation, while there is yet strength; "there seeming nothing of difficulty or danger in the work." The "work" itself is thus described: "To perform the operation, the patient ought to be laid flat on his back upon a table or form, and bound thereon. Then an incision must be made upon the upper part of the scrotum to the Production, which requireth also to be divided, without touching the intestines or omentum; then a canula (like our common director, but big as a large goose-quill) is to be passed into the cavity, under the process of the peritoneum upwards, avoiding the intestines. Then make incision of such a length as may serve to put the fingers into the scrotum, and raise the intestines and omentum, which are to be reduced into their natural place within the belly. They being much reduced, the surgeon must stitch up the wound."

ON ULCERS AND THEIR TREATMENT.

Wiseman describes several varieties of ulcers: The simple ulcer; the ulcer with "intemperies"; the ulcer with pain; the ulcer with fluxion; the ulcer with hyper-sarcosis; the ulcer with caries of the bone; the ulcer with callous lips; and the putrid ulcer. In the treatment of simple ulcer he orders dressings of various kinds, and the laced stocking. Ulcers with pain he soothed with anodynes. When there was caries he practised the removal of the bone as the only means of cure. Sometimes in such cases he removed the bone at once, in other cases he laid it bare and applied to it medicaments to assist its removal. Speaking of cases of this kind, he lets us know that in 1652 he passed from Chester to London, and took in his way the little village of North Luffenham, in the county of Rutland, still a pretty, rural place, and here stayed to treat a freeholder for a tumour of the thigh. Our surgeon opened the tumour, let out the contained matter, and, finding the bone carious, had a cautery made at the smith's, and dried the bone that way. "The exfoliation was here insensible, the scales mouldering away." When our operator left the patient the ulcer was nearly cured, and one or two months after the freeholder returned to his husbandry.

In another case he took out the lower jaw, cutting through the bone with watch files. This must have been done during the wars, for the patient was an officer in the King's Regiment of Foot, who, while marching at the head of his company on a hot summer's day, was seized with a pain in one of the teeth of the lower right jaw.

A tooth-drawer, in taking out the tooth, fractured the alveolar process. This was the origin of the malady. Wiseman's operation led to complete recovery.

Wiseman hated empirics, and always attacked them when he had the chance. He refers to the mischiefs arising from the use of a purgative called Lockhart's pill. In one case he gave a braggart empiric full scope, and allowed him to dress an ulcer his own way, a speedy cure being promised. The result was unsuccessful, and the patient again resorted to Wiseman; she recovered, and by the continued use of the laced stocking remained well. In one instance, where an ulcer existed over the fibula with caries of the bone, he cut through the tendons covering it, and in time removed the bone, a callus forming in its place.

In the year 1654 he tells of a Londoner who, on his own surgeon dying, asked Wiseman to take his place for the same salary. Wiseman accepted, and the case did him credit.

TREATMENT OF HÆMORRHOIDS.

In some cases Wiseman used the royal styptic liquor; also "that old remedy, fried leeks and butter beaten to a cataplasm." He did not hesitate to remove hæmorrhoidal tumours, and it may be inferred from one passage that he occasionally employed the ligature. As an astringent red wine is recommended. When the bowel protrudes, and has to be returned, this astringent is to be applied with *scarlet* cloths. Why scarlet? There is an explanation to be found some day about this. To excrescences vitriol stone is applicable.

All species of excrescences about the anus are for the most part, as Wiseman thought, symptoms of the lues venerea. In removing excrescences he used the *speculum ani*; and, when he thought it proper, applied the ligature to the base of the enlargement.

For fistula in ano, the way of laying open the fistula was, according to his view, either by incision or by ligature. The incision was made with scissors, if the sinus was short; with the thread if long. Cauterisation with vitriol was likewise practised.

THE CURE OF THE KING'S-EVIL BY THE ROYAL TOUCH.

Wiseman, little given to credulity in matters ordinary, had a firm faith in the efficacy of the royal touch for the cure of scrofula, and is jealous that the kings of France should presume to a Divine right,

as well as a royal and immortal gift, descending direct on the occupants of the English throne from the time of Edward the Confessor. If (he adds triumphantly) the French kings have the gift, they have it later than the English; Dupleix himself, a most diligent writer of French history, deriving it no further than Philip I. and "Lewis the Gross." The cure, says Wiseman, can be done without the sign of the cross, and he has himself been an eye-witness of many hundred cures by His Majesty's (Charles II.) touch alone, without any assistance from surgery. He gives the following statement about Charles I.: "It is needless also to remember what miracles of this nature were performed by the very blood of his late majesty of blessed memory; after whose decollation by the inhumane barbarity of the regicides, the reliques of that were gathered on chips and in handkerchiefs by the pious devotees, who could not but think so great a suffering in so honourable and pious a cause would be attended by an extraordinary assistance of God, and some more than ordinary miracle; nor did their faith deceive them in this point, there being so many hundred that found the benefit of it. If his dead blood were accompanied with so much of virtue, what shall we say of his living image, the inheritor of his cause and kingdom, whom, though it hath pleased God to deliver out of those dangers that overwhelmed his royal father, yet it was with so long an exercise of afflictions, that though (God be thanked) he be not now likely to increase the catalogue of martyrs, yet he may well be added to the number of confessors? This we are sure, that the miracle is not ceased."

But Mr. Sergeant Wiseman went even deeper into the royal touch mystery. He noticed the "evasions that obstinate and incredulous men have used to avoid so great a notoriety of experience." He takes upon himself to prove that the touched were not cured by change of air, not by the effect of imagination, not by gold; and these points settled to his own satisfaction, he supplies, for the purpose of meeting "the infidelity of many in his fantastical age," an account of what nature and art have done, or can do, for this disease. He says that the cases presented to His Majesty were chiefly those "*of tumour about the musculus mastoideus or neck*"; also "*the thick chapped upper lips and eyes with a lippitudo*." In other cases, "*We give our judgment more warily*."

His definition of king's-evil is as follows: "A tumour arising from a peculiar acidity of the serum of the blood, which, whensoever it lights upon glandule, muscle, or membrane, it coagulates and

hardens ; when it mixes with marrow, always dissolves it, and rotteth the bone."

The remote causes of the disease he believes to be referable to various heads, viz., "living in a thin and sharp, or thick and foggy air ; diet of salt, sour, and slimy meats ; want of exercise ; natural complexion ; hereditary transmission ; the milk of a nurse infected with the disorder." External accidents are also, he infers, occasional causes of the evil, but when they excite the disease, "they suppose a pre-disposition of the body to it." "A straight stay, as some women and children wear them, hath too often the same effect."

The glands, muscles, viscera, membranes, tendons, or bones, are the parts most commonly affected with the disease. He does not remember to have seen the nerves or brain affected with a scrofulous tumour.

In the cure of king's-evil, Wiseman held that three intentions were necessary—I. The "regiment" of diet and the other "non-naturals"; 2. Pharmacy, or internal prescriptions; 3. Applications of externals, either to discuss, suppurate, or extirpate the glands. His dietetic plan is not very profound. He sometimes recommends fasting; at other times he orders medicated broths and ass's milk. Good air he considers a great help to cure. Hampstead is too piercing, Kensington is more gentle. He mentions one fact "which he leaves to his reader's judgment, whether it ought to be attributed to the smoke or the northern blasts from Highgate. A patient of his and of Dr. Thomas Cox was wasted almost to skin and bone. They removed him to Knightsbridge, from whence, after some weeks—he having a little recruited his strength and being eased of his cough—they removed him again (for the more conveniency of curing an ulcer with caries of the cranium) to a lodging near King's Gate, Holborn, which stood backwards, and airy enough, opening to the fields. In two nights he was so much worse that they expected he might die. They took him back to Knightsbridge, where he soon recovered.

Exercise of body ought, Wiseman held, to be enjoined in this disorder, "it being necessary to waste superfluities." Sleeping in the day is forbidden. Passions of the mind ought to be tolerated. The pharmaceutical treatment of our author it is impossible to follow. He gives us prescriptions by the square foot. Mercurialisation was with him an occasional means of cure in strumous cases. The external applications recommended are ointments of various

kinds. Opening the tumour if it contain pus, and extirpation if it be loose, are necessary lines of cure.

Some time about 1673, being called into the country, Wiseman returned home grievously diseased; but a bad case being on hand in which he had attempted to operate for the removal of a spina ventosa in the inferior maxilla, he was carried from his room to the consultation, at which Dr. Lowre was present. The case was one of convulsions, tetanus following operation, "suspected to be occasioned by some shivers of the bones pricking the membranes." A few hours later he was called again, but had not strength of hand to make use of the knife.

"Dr. Charleton and Mr. Hollier were at a public dissection in our theatre, where Dr. Walter Needham was reader; only Dr. Lowre and Jacques Wiseman were to be found." These gentlemen, therefore, operated by removing a portion of bone of the eschar. This patient died convulsive on the third day—a result ascribed to the constitution of the patient rather than to the operation, *per se*.

In illustration of the great evils that may arise from little ones, Wiseman remarks on the "Monument in Westminster of the young lady holding up her finger prickt with a needle, of which she died." No doubt the famous lady whom Mrs. Jarley afterwards immortalised through little Nell!

In this part of Wiseman's works, we read of the *Public Healing Exhibitions*, possibly at hospitals or dispensaries. We learn also that he lived now near Covent Garden; that a Mr. Stockdale made instruments for him; that he sometimes got attacked on the subject of his skill, and once had to obtain a letter from a gentleman whose son had been under his care, whereby to save his reputation; that he went into the country during the year of the Plague; and that William Clarke, who had been his servant, but afterwards settled as a chirurgeon at Bridgnorth, wrote a letter bearing date November 26th, 1675, to his "honoured master," about a case in which both were concerned.

ON EXCISION OF THE TONSILS AND ON TREATMENT OF WOUNDS.

Two curious chapters on ophthalmia are followed by one treating on the tonsils, in which we are informed that Mr. Edward Molin was the first chirurgeon who performed the operation of extirpation. He did it with the actual cautery "through a canula, well contrived for the purpose." The operation was not one, however, of clear

extirpation. The pointed cautery was passed through the body of the tonsil, which afterwards "crumpled up." Wiseman improved on this operation by affixing a ligature round the neck of the tonsil and then snipping it off wholesale with blunt-pointed scissors. He also practised snipping off the uvula in cases where that organ was elongated, but I must let these matters pass in order to come to the *treatment of wounds*.

Wiseman's definition of a wound is at once simple, precise, and brief. "A wound is a solution of continuity in any part of the body, suddenly made by anything that cuts or tears, with a division of the skin." Not less simple and truthful was his plan of *treating* wounds. I give his own words on this subject.

"The wound being a solution of continuity, doth require to be made one again—*Unity being the perfection of whatsoever hath a being*. To effect this is the work of nature and art; both must mutually join their helping hands, and unless both the vital faculties and nourishment of the part do assist the art of the chirurgeon it will be lost labour; here must be a joynt meeting and agreement all in one." For simple wounds the chirurgeon is to afford assistance by five "intentions."

"1. By careful and diligent taking away all such extraneous bodies as by their agglutinations may hinder the true agglutination of the disjoynted parts, whether they be concrete blood, hair, sand, dust, pieces of bones, cartilages, or pieces of weapons, rags, and the like.

"2. By bringing the lips of the wound evenly together.

"3. By retaining the lips so brought together that they may, by consolidation, be restored to their former figure.

"4. By considering the temperament and natural heat of the part, in order to union.

"5. By preventing all accidents, and correcting such as have already seized the part."

The second of these *intentions* is to be performed by bringing the lips of the wound exactly together. "This intention is delivered in a few words, *but they are to be observed as a law*. Nature hath nothing to do here in bringing the lips together, that is the sole work of the chirurgeon; who must not lay a pledget, or crowd a dossil of lint into the wound; *no*; that is the way to keep the wound open, and make it painful, whereby defluxions are stirred up, the temperaments of the part weakened, and the cure prolonged."

Wiseman is further very exact respecting the way in which

wounds are to be brought together. The parts must be made to answer one another, that nature may do her work more speedily and surely.

For the holding together of wounds he recounts three plans—recoiling, stitching, and “fibulas or clasps.” He explains why the sympathetic powder gained so much credit, *i.e.* nature alone effected the cure. He enumerates several kinds of stitches: the separate stitch, the glover’s stitch, the stitch “performed with pins and needles, as in hare-lips,” and the dry stitch, *i.e.* the laying of two pieces of some adhesive plaster on each side the wound, and, when they adhere, the passing the stitch through the one and the other of these, instead of the skin. In the cure of wounds the habits of the patient must be carefully considered. He considered it bad practice, in cases where the wounded were free livers, to put such at once on low diet.

In the wars Wiseman had constant experience in the cure of compound wounds, especially of those inflicted by the sword. These wounds were mostly produced when the horsemen fell in amongst the infantry, in which case the latter had the worst of it by considerable odds. In the treatment of such wounds he was once, he says, assisted by Mr. Sanderson, “now one of the chirurgeons of St. Bartholomew’s Hospital.” At Stirling, in Scotland, he was helped by Mr. John Chase, Apothecary to his Majesty. In compound wounds he still recommended the attempt by the first intention.

Wounds of Arteries.

If the artery is wounded by a simple wound, the lips of the wound may be brought together by a glover’s stitch, and firmly bandaged afterwards. If this does not succeed, the artery is to be “taken up and tied.” If tying cannot be accomplished, escharotics or the actual cautery are to be used.

Surgery on the Sea.

In speaking of wounds of the face, Wiseman introduces an occasional anecdote, throwing a little light on his own career. “When,” says he, “I served among the Dunkirkers, when snick and snee was, as it were, a fashion, I had much of this sort of work” (face mending) “and for your diversion shall set you down

one instance of that kind. While our squadron laid at anchor in the Groin, there came in some Hollanders, under the action of Hamburgers, with their ships new trimmed up for the King of Spain's service. A boatswain of one of these ships happened to be in company ashore with some of our men. While drinking together, the Hollander began to prate of religion, upbraiding one of our men for wearing a cross, and after a while he became quarrelsome, and swore, *sacrament*, he would not wear a cross; no, the devil take him, repeating it often. One of our men beat him down, and fell with him; then, kneeling upon his breast, and holding his head down, he drew out a knife, and cut him from the ear towards the mouth, then from the os zygoma to the neather jaw. 'Now,' said he, 'you shall wear a cross, that the devil do not carry you away.'" Wiseman being called, treated the wound by suture, and produced a satisfactory cure. The patient was proud of his scar.

FINALE.

Wiseman's writings discover to us many other curious anecdotes. They introduce us to Prince Rupert's chief chirurgeon, Mr. Shocque, and to the General Chirurgeon of the Scottish army, Mr. Pennicuke. They exhibit Wiseman in the character of fighting chirurgeon, running away from Truro with the rest; and, in order to release himself from a wounded trooper, showing the trooper a portion of his (the trooper's) own brains, as a kind of proof that a chirurgeon could do no good if he stayed; the sight whereof so "calmed" the patient's "passion" that the chirurgeon had liberty to continue his flight. They exhibit the sergeant further at the fights at Musselburgh, Taunton siege, and Weymouth; at which latter fight he is discovered while running away, halting a breath, to assist up an Irishman who had been operated on a day or so before, and the Irishman, once on his legs, outruns the chirurgeon.

Lastly, the surgical reader will find among other things that Wiseman, in amputation of limbs, used the circular incision, but incised at once to the bone; that he stopped bleeding vessels by the cautery or ligature; that he was a conservative in regard to operation, and refused to cut off a whole hand, if even a finger could be saved; that he knew how to reduce shoulder dislocations by putting the heel in the armpit; that he prescribed mercury and sarsaparilla in syphilis, and did not believe in the cure of syphilis without mercury.

In the Royal College of Surgeons there is a fine oil painting of Richard Wiseman, which portrait, by the kindness of the Council, I present, in autotype, with this biography. The face speaks eloquently for its original, and is, I believe, all else that remains of the personal history of the best representative of the surgeons of the Commonwealth.

Ambrose Paré, and the Birth of French Surgery

"And let this be the bond of this our immense labour, and by God's favour our rest : to Whom Almighty, All-powerful, Immortal, Invisible, be ascribed all honour and glory for ever and ever. Amen."

THESE are the words with which Ambrose Paré, commonly called "The Father of French Surgery," closes his one and great work—the work by which he lives through the ages ; a work full of curious passages which unintentionally depict its author, and from which, though it narrates no life in set form, a life could so easily be written, that in this memoir it alone has been the main trust and authority.

The quotation supplied above, when taken with the date of the era in which its writer flourished, 1517 to 1590—era including and overlapping that of Vesalius, and just including the commencement of that of Harvey—tells a great deal respecting the man. It proclaims a man conscious and proud of his own labour, "our *immense* labour"; it proclaims a man who, relying on a power beyond his own power, is prepared to lay himself in the eternal sleep, "by God's favour, our rest"; it proclaims, as with a last breath, a Protestant—a Protestant of the grand unyielding Michael Servetus school, who, setting at defiance the fires of Romanism and of Calvinism with equal contempt, worships only the God "Almighty," "Immortal," "Invisible." Lastly, by the use of two words of the same import—"Almighty," "All-powerful"—it proclaims a man of redundant speech and expression; one whose words and acts flow over; whose soul is as a gorge which rushes from the mountain side, and which men stand at a distance to see and fitly admire.

The sentence is the man.

Ambrose Paré, more than once, appears on the stage of the player



AMBROSE PARE,

COUNCILLOR OF STATE AND SURGEON-IN-CHIEF TO HENRY III. OF FRANCE.



—that life, in miniature, of men and things. The fact is not surprising, for his life adapts itself to every picture. It was a life of romance, of adventure, of brave deeds, of active pursuits, of experience, of courage, of danger, of literature, of art, of science. It was the life of a man who could travel, ride, converse, draw, write, observe, be merry, be grave, give command, obey, encamp with soldiers in the field, luxuriate in palaces with emperors and kings, work in a laboratory, compound medicines, invent instruments and appliances, superintend workmen, cut off or set limbs, extract weapons from wounds, deliver women with child, embalm the dead, assume disguise, play with consummate skill the art of the barber, tell a rattling story, do any act of kindness to any child of humanity however poor or lowly, take part in war denouncing it all the while as the curse of curses, love his own career and yet be ready at any moment to die for his own solemn opinions, worship his own work and yet be generous in the appreciation of others' work, be industrious to a fault, doing oftentimes to-day what he ought to have done to-morrow, and still finding so much time for recreation and repose as to live to a comely age, and out of all the shifts and shadows of continued contest emerge into immortality by a happy death.

Such, in brief, was Ambrose Paré; one of the glories of mighty, beautiful, sorrowful, rejoicing France, at a time when her people tolerated untold oppressions, because they had not learned to taste the blessings of freedom;—France under the heel of apostolic princes, popes, priests, and punishments.

Out of such a life it would be an easy task to select fifty themes, but here Ambrose Paré as a light of surgery must be *the* theme; and, indeed, it is naturally so, for he, Paré, was of all things a surgeon, whose hands were ever the powerful servants of his intellect—a surgeon born, not made.

EARLY LIFE.

A little school book, read in the academies of France in this day, and a truly delightful essay for scholars of all ages, written by Eugène Muller, tells how the Father of French surgery commenced his career.

In the early years of the sixteenth century, and the beginning of the reign of the first absolute king of France, Francis I., there lived in the outskirts of Laval, a town in the old province of Maine, now

forming the department of La Mayenne, a joiner by the name of Paré. This poor man had brought up two sons and a daughter, and, finding himself advanced in age, felt he was not in much of a condition to pay expenses for his last and dearest offspring, young Ambrose, a boy of great intelligence, of active and penetrating wit, and of ardent ambition to learn, born to him in the year 1517. The father was advised to encourage, according to the amount of his means, these fortunate inclinations of the boy, who, at the little schools in the town, learned to read, write, and calculate. To open a larger horizon to this young and inquiring mind, M. Paré sought a master, and found one in a chaplain named Orsoy. "You wish your child to learn Latin," said this ecclesiastic. "Very well; I will teach him." "In return," replied the joiner, "the child shall give you all the little services that he is in a condition to render." And the bargain was concluded.

Of the two other sons of the joiner, the second only had embraced the paternal occupation; the other, the eldest, had become a barber-surgeon, and had a shop at Vitré. The daughter was married to a master-surgeon, who practised in Paris. The family was thus already connected with surgery, but in two different ways, which deserve exposition.

Those who practised then the art of healing the sick were divided into three distinct classes. The first was the solemn faculty, the grand body of physician doctors, who, rightly or wrongly, through the clouds of their learning or by their ignorance, had become the laughing-stock for the wits of the day. These physicians only obtained their title of doctor after long studies in ancient texts, and after many examinations in Latin; and convinced that they possessed intellectual ability in its highest acceptance, they considered another class called "master-surgeons" singularly inferior to themselves, and traditionally and legally subordinate. Not facing, but studying maladies from a theoretical point of view, these doctor physicians made few anatomical studies exacting a manual application. This they left to the care of the surgeons, who became a species of workmen, relatively degraded by their work, and, in some measure, servile. They were not allowed to practise, except after having submitted to examinations which the doctors made them pass, and after having submitted a thesis in Latin. The diploma of master-surgeon, which they then received, forbade all purely medical practice. They might operate, patch up or dress wounds; but they had no liberty to write a prescription as a doctor would; they ought, in a

case of necessity, to humbly fetch to the patient a physician, who alone had the right to formulate a prescription.

The master-surgeons who held diplomas formed a brotherhood, who were placed under the protection of Saint Côme, and who, on their side, as if in revenge, did not fail to be singularly jealous of their rights and privileges. Beneath this brotherhood, in a state of well-marked inferiority, came a corporation of "master barber-surgeons," who, with the art of shaving, practised what was called inferior surgery—the treatment and dressing of boils, anthraxes, and bruises. To obtain the diploma of master barber-surgeon, it was necessary, while having the title of apprentice in the house of a barber working in a shop, to follow at the school of St. Côme a course which made a surgeon, limited to the art of treating tumours and superficial wounds. Of medicine, anatomy, and surgery, properly so called, not one word was taught, for these arts were thought useless to the barber.

Ambrose Paré! why should he not aspire? Instead of remaining a barber-surgeon in a little town, like his brother, why should he not become, like his brother-in-law, a member of the brotherhood of Saint Côme? The first step was taken—he was to learn Latin, the language which was the key to all serious studies, and without which no examinations were possible, no diploma in prospect. The chaplain Orsoy, however, understood the duties of a teacher in a very singular manner. Whatever was the good-will with which the child strained himself to make progress under such a master, the parents were not slow to discover that he could only acquire there the training required for a gardener or a groom; he must consequently renounce the surgeon's diploma, and, as his tastes seemed to carry him towards the vocation, he must remain a barber-surgeon like his brother, who, after all, being well established, gained his livelihood in a very honourable manner.

On this reasoning, which was not without wisdom, the joiner placed his son as an apprentice to one M. Vialot, a barber-surgeon keeping a shop in the town of Laval. There for some months the child, whose activity and docility were his principal virtues, commenced to put his hand to the elementary practice of his profession. He learned to shave, and, in time, to bleed, to dress slight wounds—acts which did not give him a high opinion of the career he had entered upon, nor point out distinction. But while with M. Vialot, and while yet a boy between twelve and thirteen, Ambrose was taken to witness an operation by a famous practitioner, who astonished all

the assistants by his precise knowledge, and by the certainty and dexterity of his hand. On returning from this scene, the barber said to the apprentice :

"Thou hast a very peculiar expression ; I really think I did wrong to take thee with me ; it has overwhelmed thee ; thou art too young."

"Young ! Oh, no. No, master ; on the contrary, quite the contrary ! One day I shall become full surgeon, master," replied Ambrose, raising his head very high.

"Surgeon ! But, poor child, you do not know Latin."

"Latin ! Latin ! As if Latin had anything to do with the thing we have just seen ! As if all the merit of this great surgeon was not in his knowledge of the human body, and his skill in the use of his instruments !"

"Very good ; but Latin is necessary for the theses."

"*Eh, mon Dieu !* I shall learn Latin."

"Alone ?—you cannot ; you must pay for masters."

"Then," cried Ambrose, "I shall pass them over."

Master Vialot shook his head. "The child is unreasonable," said he to himself ; "it is of no use to discuss the subject any more with him."

This account of the first step of Paré towards fame tallies with his own account of it in later life :—

"I was but twelve years old when this appetite was awakened within me ; seeing and recognising, after a difficult and skilful operation of which I was a witness, how useful and helpful was the science of surgery. It appeared to me to be beautiful and best of all things to work thus for the relief and cure of suffering. From the moment when I promised myself that this should be the task of my life, the desire and pleasure to be useful was my principal aim ; and since then I have always moved towards that end. I left my country home haphazard, trying to support myself by doing my best in the houses of the master-barbers in the provinces. Whenever I had an instant in the daytime, taking the time from sleep during the night, I read, I studied, and, above all, I never lost any opportunity to observe all that had reference to the formation, to the mechanism of the human body. But in the provinces books are rare ; the patients of my masters only came to consult them about insignificant evils, and were not sufficient subjects for study. I was anxious to see true surgery ; so from town to town I wandered, until able to reach Paris. There I was still obliged to enter as an apprentice

in a shop. In the hours we were allowed to leave the master to be present at the conferences of the College of Saint Côme I found a centre to my tastes ; but so little was taught to the poor barber-apprenticed surgeons that were to become masters, we could only possess ourselves of some dressings and some incisions. Soon these meagre lessons did not suffice for me. Always reading and studying and showing some element of knowledge, I succeeded in getting admitted as clinical clerk to the Hôtel Dieu. There I resided three years, and there saw a great diversity of patients who were treated there. I was able to see and to know the corruptions and the evils of the human body, and at the same time learned, on an infinity of dead bodies, all that can be said or considered in order to arrive at the knowledge of the great secrets of chirurgery."

THE BARBER-SURGEON.

At the age of nineteen Paré was rewarded. One day he came from the College of Saint Côme, reading as he walked something that was written on a leaf of parchment which he held unfolded in his hands. A friend, a clerk of the University, drew near, and asked, "Is it accomplished?" "*Mon Dieu!* yes, see, the soonest possible." And the parchment was placed open under the eyes of the chance-comer, who read:—

"Whereas—before us, Regent-doctors of the Faculty of Medicine of Paris, Ambrose Paré has presented himself to be heard, examined, and proved, on the theory and practice of the different operations of the profession of barber-surgeon. After having proceeded to the hearing, examination, and experience of the aforesaid ; after having seen and considered his replies, we have declared and do declare him apt and sufficient to cure boils, anthraxes, bruises, and carbuncles ; and in consequence we have conferred upon him the title of master barber-surgeon, so that to him may be admitted the profitable rights of this title."

To the congratulations of his friend, who predicted great success for him in the position of barber-surgeon, Ambrose replied, "It is a title which in time of need may be useful ; but it is a first step—nothing more."

The newly-designated barber-surgeon did not, it would seem, wait long for employment. He soon found work in the army, and, as he records himself in his *Apology: A Treatise concerning Divers Voyages or Travels*, he was sent as an army surgeon, in 1535-36, to

"Thurin," to serve under an officer, Colonel-General de Montain, commander of the foot soldiers, whom he (Paré) had treated for a slight illness, and who had formed a high opinion of his knowledge. Montain arranged that Paré should follow the army in the position of surgeon or assistant-surgeon, and he was away from Paris for two years. At first he was occupied at the passage of arms at Suze. Several were killed or wounded. One expression at this eventful time gave the young chirurgien great fame. A captain, named Ralt, received a gunshot wound in the ankle-bone of the right foot, so that he fell to the ground. Coming under the care of Paré, he recovered, whereupon Paré made the remark which has been adopted as his motto, "I treated him, God cured him." The French entered the town *en masse*, and Paré was greatly distressed by the horrors which he saw now for the first time. He entered a stable to put up his horse, and found there four dead soldiers, with three others leaning against the wall, their countenances frightfully disfigured. They neither saw, heard, nor spoke, and their clothes were still on fire from the powder from the cannon which had burnt them. While he was looking at them, one of their old soldiers came in and asked if they could be cured, and, as soon as Paré replied in the negative, drew near to them and quietly, and without anger, cut their throats. Paré called him, indignantly, "a bad man." He replied, that he prayed to God if he were in a similar condition that some one would be found to do the same office for him, so that he might not be left to languish miserably.

At that moment Paré wished he had never left Paris, but he was led on to the siege of the Château Villane. The besieged fought well, and killed or wounded so many that surgeons were much needed, and he, Paré, who was quite a novice, made his first mark. He had read in Jean de Vigo—a Genoese surgeon, at the end of the fifteenth century—that gunshot wounds contained a poison which was in the gunpowder, and that oil in which the bark of the elder-tree had been digested should be poured, scalding hot, into such wounds. He found also that this was the accepted line of practice, and that, in spite of the agony of the patients, the oil was poured into the wounds as near to boiling heat as possible. He commenced as the others, much to his after-regret, to pour in the boiling oil; but once, not having sufficient oil, he applied in its place a mixture of the yolk of egg, oil of roses, and turpentine. That night he could not sleep from the anxiety he felt in case he, from omitting the heated oil, should find his patients empoisoned. He rose very

early in the morning, and to his great relief he found that those to whom he had applied the cold mixture felt very little pain, and that their wounds showed neither swelling nor inflammation; they also had slept well during the night, while those who had been treated with boiling oil were in great agony, and were suffering from fever, with swellings formed around their wounds. Thus he demonstrated that gunpowder was not poisonous, and promised himself, with great mental relief, that he would never again scald the wounded men. The other surgeons, in spite of evidence, continued to victimise the wounded, their opinion being that as the ancients treated them so they should not change anything; and they made of Paré's treatment a jest.

Soon after these events the Marshal de Montain sickened from "hepatic flux," for the treatment of which a famous physician had been summoned from Milan. This physician, whose name is not supplied, was much surprised at Paré's skill and wisdom, and spoke of him to the marshal as a surgeon young in age but very old in knowledge and experience. "Take care of him," said he, "for he will do you service and honour;" and no doubt the marshal would have remembered the injunction, but death cut short all his labours.

Declining to accept the post he held under the marshal who followed Montain, much lamenting the loss of his first friend, and wishing for time in which to digest what he had learned in the campaign, Paré returned to Paris to open once more a barber-surgeon's shop—for the dignitaries of Saint Côme would still not permit him to practise as a master-surgeon without undergoing the Latin test—and for five years he, by repute a fine surgeon, but by qualification little more than a barber, continued in Paris undergoing persecution from those who were more favourably circumstanced as the brethren of Saint Côme. During this interval, and at the age of twenty-four, he took to himself a wife, and thereby attained to a domesticity which was throughout prosperous, congenial, and happy.

He was settling down in modest contentment to his lot, when his career was changed once more by war. The French took up arms against Spain, the nobles collected their forces in order to serve their king, and Monsieur de Rohan, a lord of Breton, caring nothing about the qualification or the brothers of Saint Côme, attached Paré to his company, the will of the great lord being of itself a diploma for the young chirurgien during service, in those days of absolute nobility. This service in Brittany lasted some months, for which on leaving for Paris to rejoin his family Paré received fifty ducats, two horses, and

a diamond of thirty crowns. In the same year he went again with De Rohan to Perpignan, and from that time for twenty-three years was on and off with the army practising surgery and collecting experiences which are as useful to the historian as to the biographer.

At Boulogne, where he encountered English soldiers, he learned several useful hints, specially on injuries produced by the force of the wind caused by a cannon ball. One day, from tower of "Order," the enemies fired a ball at some French officers, who were talking together. The ball hit none of the officers, but one of them was so struck by the wind that the outer part of his thigh became black and blue, so that Paré had to dress the part and make "divers scarifications to evacuate the contused blood." He himself also, in one instance, being moved by the air agitated by a cannon ball, ducked his head, at which the soldiers laughed because the ball had already passed him. Here, too, Paré signalised himself, in an eminent degree, by an operation on one of the greatest warriors of the time. The famous Duke de Guise was hurt with the stroke of a lance, "which above the right eye, declining towards the nose, entered and passed quite through on the other side between the nucha and the ear, with so great violence that the head of the lance with a great portion of the wood was broken and remained within in such sort that it could not be drawn out but with great force, yea, with smith's pincers." But, as Paré usually expresses himself, "by the help of God my said lord was cured," the cure being followed by a cicatrix which obtained for the duke the sobriquet of "Balafré," the scarred.

Between the year 1545, when the expedition to Boulogne was carried out, and the year 1552, Paré seems to have lived in Paris, and to have been busied in practice, still as a barber-surgeon. He had now attained such fame that Sylvius de Boe, the anatomist, invited him to dinner; and, impressed by his knowledge, suggested to him to write a book on "methods of treating gunshot wounds, and wounds from other arms, such as arrows and lances." The suggestion, favourably received by Paré, was the cause of a storm of opposition. That a barber-surgeon should dare to write a book! But the book was written, and met with so much success that a second edition was soon demanded.

In 1552 the second edition appeared, and not long afterwards its author was away again with the army under De Rohan as surgeon to a company of fifty horse. Paré calls this the "Voyage of Germany." From thence he proceeded to Danvilliers, which his king, Henry II., besieged. Here, our surgeon records, he amputated the lower limb

of a wounded man "*without applying hot irons,*" using, that is to say, the ligature instead of the cautery, and the camp being broken up, he and his patient returned to Paris together. "I dressed him," says Paré, "God cured him; and I sent him to his house, merry with his wooden leg, and content, saying that he had escaped cheaply not to have been miserably burnt."

Later on, in the same year 1552, Paré was away once more to the wars. King Henry II. had levied thirty thousand men to make spoil about Hedin, and the King of Navarre, as chief of the army, sent for Paré and pressed him to follow him. The surgeon cried excuse: his wife was ill in bed. "There are," responded the chief, "physicians in Paris who can cure her, and I have left my wife, who is as well descended as yours;" so he commanded that our barber-surgeon should be attached to his company. The campaign ended in the taking of the Castle of Compt, after which so greatly had Paré distinguished himself that his chief sent a gentleman to King Henry, "who told the king," Paré modestly declares, "more good of me than there was by half. Then the king said that he would have me into his service, and commanded Monsieur de Goguiet, his chief physician, to write me down as one of his surgeons in ordinary, and that I should go meet with him at Rheims within ten or twelve days, which I did, where he did me the honour to command me that I should dwell near him, and that he would do me good. Then I thanked him most humbly for the honour it pleased him to do me in calling me to his service."

Following upon this campaign, Paré was sent into Metz under most peculiar circumstances. The town was besieged by the troops of the Emperor Charles, and news reached the French king that his forces within the city were being poisoned by the drugs used for the cure of the wounded. The Duke de Guise, six other princes, and a large garrison were thus endangered; and the king, anxious to save them, sent Paré with an Italian captain as guide, an apothecary named Daigue, and as many drugs as a post-horse would carry, to endeavour to steal through the enemy's lines by night and enter Metz. When they neared the lines Paré found a league and a half of bright fires around the city, and "wished himself at home at Paris, for the imminent danger he foresaw." But by good fortune and skill he and his assistants got in safely, and soon the great work of the skilled surgeon played its useful part. There was no truth in the rumour about poison, but under the extreme cold and bad attendance the officers and men were dying very fast, until Paré arrived and changed

the treatment that was being pursued. After a time the Emperor withdrew his forces, in consequence of a clever stratagem by the Duke de Guise ; Metz was free, and Paré received a grand testimonial from all quarters. On his return home, the king received him with a loving countenance, gave him five hundred crowns, and told him he would never leave him poor.

One more piece of good fortune after Metz crowned his fame. In 1553 the Spanish emperor, Charles, had threatened to capture the Castle of Hedin. The French, therefore, had the castle strengthened and supplied with eight hundred soldiers and several distinguished officers, to defend the place, with Paré as chief surgeon. The attack came, and Paré's account of it, extending over many pages of his work, is rich in incident. It is sufficient here to say that the place was taken, and that Paré, now a man of great consequence, gave up all his fine clothes, and entered, in disguise, as a poor attendant on one of the wounded French officers, M. de Martigues. He was permitted by the enemy so to remain until Martigues died, and was then ordered to embalm the dead body that it might still be retained as a hostage. After this, the disguise probably failing, the emperor's chief surgeon took Paré apart, and asked him to serve on his staff. This offer, after many words, in which he was called a fool, he flatly refused, as he also did a later offer to serve under the Lord of Savoy ; for which two offences he would have been sent to the galleys, had not M. de Vaudeville, governor of Gravelin and colonel of foot, prayed for him to cure him of an ulcer of the leg. The task was undertaken, and in fifteen days, the ulcer having healed, the healer was restored to liberty and conducted to Abbeville, whence he proceeded to Amiens, where he found King Henry II., who had already informed Madame Paré of her husband's safety, with promise of his ransom, and who now rewarded that husband with two hundred crowns, choicest royal thanks, and permission to return home after he had furnished the liberal monarch with the full details he had gathered of the strength of the Spanish forces.

In 1557 Paré was at the battle of St. Quintin ; in 1558 at the camp of Amiens ; in 1562 he was at the taking of Rouen and in the camp at Bourges ; in 1563 he was at the Harbor de Grâce, where the English, giving way, retired to England, carrying the plague with them ; in 1564 he was with the boy king, Charles IX., at Bayonne, and remained near him for over two years ; in 1567 he was sent the day after the battle of Dreux to dress the wounded ; and later still, after the battle of Moncontour, he proceeded to

Flanders, to attend and treat successfully the Marquess of Auret, brother of the Duke of Ascot.

With this last adventure the military travels of Ambrose Paré were brought to an end. "During twenty years," says one of his enthusiastic biographers, "although there was some respite of hostilities, there was not a campaign that he did not accompany, nor a battle-field to which he did not carry his science, his zeal, and his unalterable humanity."

THE MASTER-SURGEON.

By force of character, which had thus overcome all obstacles, Ambrose Paré gradually became so elevated above his original disadvantages, that professional as well as public favour, in due course, waited upon him. His work on gunshot wounds had become a standard; the royal will had made him a surgeon beyond dispute; and, at last, the members of the Corporation of St. Côme, the master-surgeons, came to him of their own free will and accord to ask why he so long delayed to take their degree. Paré objected that he still knew nothing of Latin, and must, therefore, renounce St. Côme. The masters, prepared for the objection, had a ready answer. "Don't trouble on that score, we will get some one who will understand your Latin!" at which Paré smiled as at a joke. "We are serious," was their response. "And I will play no monkey-tricks," was the answer they got in return from the barber-surgeon.

Then they gravely told him that the interests of their great and useful art demanded that he should no longer seem to despise them, nor they him. In so speaking, they touched him in a vulnerable part, and retired with his promise that he would join their corporation.

With this understanding Ambrose Paré, on August 18th, 1554, asked to be admitted for examination for the bachelor's degree, and on the 23rd of the same month was declared admitted.

On October 8th of the same year he was granted licence to practise; and on December 18th, immediately following, the brethren assembled in great state to hear from him a Latin thesis. "He read his best, which was bad enough;" and then, in accordance with tradition, the President, amidst the acclamations of the corporation, declared him full Member of the College of St. Côme. It was a grand occasion, and the Latin thesis made it a merry one.

THE WORKS OF THE MASTER.

From these studies of the life of Ambrose Paré let us now turn for a page or two to his works and practice. The completed works were published in one large volume, dedicated to Henry III., "the most Christian king of France and Poland," and bore date, Paris, February 8th, 1579. In the dedication the author affirms: "I have so certainly touched the mark at which I aimed, that antiquity may seem to have nothing wherein it may exceed us, besides the glory of invention; nor posterity anything left, but a certain small hope to add some things, since it is easy to add to former inventions."

What a good opinion Ambrose had of himself, let the words testify. The form is not good, but the strength is mighty. A man who could believe in himself to that expressed yet scarcely expressible degree, could, being sane, and in sound health, accomplish everything that in his career and his day was possible. And this is just what Ambrose Paré did. He had toiled, he informs the king, for fifty years, and had been so prodigal of himself, his watchings, faculties, and means, that he spared neither time, labour, nor cost, whereby he might accomplish and satisfy his own desires for his great work, and the desires of the studious. "For which cause, seeking the praise and profit of the French nation, even with the hindrance of his particular estate, he endeavoured to illustrate and increase chirurgery—hitherto obscure, either by the infelicity of former ages, or the envy of professors—not only by precepts and rules, but by beautifying it with three hundred graven figures or apt delineations."

The works of Paré are included in one volume, published in French in 1575, eleven years after the death of Vesalius, and produced in English dress by Thomas Johnson in 1634, with a dedication by the translator to Lord Herbert of Cherbury. The works ring from beginning to end with chirurgery. Their author knew of three parts of physic—"chirurgery, which by the use of the hand; *diet*, which by the convenient manner of feeding and ordering the body; and *pharmacy*, that by medicines, attempt to expel diseases and to preserve health." But chirurgery stands first; "it is the most evident amongst all the parts of physic;" it is the most ancient; and, "if the difficulty of learning it be a proof of the excellency of the art, who can doubt that it is the most excellent? seeing that no one ought to be accounted a chirurgeon

who has no knowledge of diet and regimen, but both the others can perform their parts without chirurgery." "In antient times there was but one performer and user of all these parts. But the multitude of men daily increasing, and man's life decreasing, so that it does not seem able to suffice for to learn and exercise all the three, the workmen divided themselves."

Surgery or chirurgery is defined as "a diligent operation of the hands, strengthened by the assistance of diet and pharmacy."

Five things are declared as proper to the duty of a chirurgeon : (a) To take away that which is superfluous, as in amputations ; (b) To restore to their places such things as are displaced, as in hernias ; (c) To separate those things which are joined together, as in parts rendered adherent by burns ; (d) To join parts which are separated, as in stitching up a wound ; (e) To supply the defects of nature, as in setting an eye, an ear, a nose, or one or more teeth, or filling up the hollowness of a palate produced by syphilis, with a gold or silver plate.

After the definitions of surgical art, the author proceeds to consider "*things natural*" : the *elements*, which he names as fire, air, earth, water ; the *temperaments*, which he divides into the sanguine, choleric, phlegmatic, and melancholic ; the *faculties* ; the *actions* ; and the *animal spirits*. Then he passes to the things "*non-natural*," things *taken, applied, expelled, and to be done*. This is followed by a definition of disease, the nature of symptoms, the indications of cure of disease.

These significant passages are culled from the "first book" of the complete works of Paré, but there are twenty-eight more books in sequence, not one of which ought to be neglected by the surgical scholar, who will find in Johnson's translation, or better still in Malgavne's recent edition, all that he may desire. These books are on anatomy, tumours, wounds, gunshot wounds, contusions, and gangrenes ; ulcers, fistulas, and hæmorrhoids ; bandages or ligatures ; fractures, dislocations, divers preternatural affections, usually left to cure by surgery ; the gout, the lues venerea ; the plague ; the means or manner to repair or supply the defects of man's body ; the generation of man ; monsters and prodigies ; the faculties of simple medicines, as also their composition and use ; distillation ; how to make reports, and embalm the dead ; and last, but historically first, a treatise of his divers voyages or travels in his career with the army.

As the leaves of these books are turned over, the temptation is

great to comment on the subject-matter presented for study, until it becomes clear that nothing short of a new English edition of the whole would satisfy the reader. I can, therefore, convey no more than an idea or two of the reason why, by his writings, this barber-surgeon of France became a surgeon of lasting celebrity.

There was in his work *rich humanity*. Ambrose Paré had a heart that was greater than his mind, and many things which he did were prompted rather by good feeling and kindness for the suffering than by foresight or science.

There was in his work *courage* as well as humanity; the man gentle as a dove was brave as a lion. He feared no physical dangers; he knew his own mental strength; and he rested on both without shrinking or care of contradiction. These facts explain as they excuse what has been called his egotism.

There was *pride* in his work; but it was pride that was justified by results, and it was tempered by the knowledge that he, at his best, did but place the sick in conditions favourable to recovery. He treated, God cured.

There was *skill* in his work, as the numerous surgical instruments which he invented, and many of which remain to this day, abundantly testify, and as the records of his operative proceedings equally proclaim.

There is, lastly, in the work, *solidity*, earnestness in all that is written, combined with an unceasing care and watchfulness, which alone were sufficient to stamp the man as a man "*sui generis*," whom the princes, nobles, and peoples singled out because of merits which would not be despised, and which could neither be ignored nor forgotten.

Too little has been made of these grand qualities in Ambrose Paré, too much has been made of his originality. It is true that in his treatment of wounds he cast aside the awful practice of pouring in boiling oil, and in place of that barbarous practice employed an antiseptic dressing of terebinth and oil of roses, digested with albumen. But in this change he merely reverted to a practice which even in his time was as old as the hills—perhaps older than a great many—a practice which we know, by modern return to it, has striking advantages. Again, it is true that in arresting hæmorrhage from bleeding arteries he threw aside the cautery for the ligature, for which it is said his enemies derided him as one who "let life hang on a thread." It was a courageous act, at first most courageously done on the temporal artery of a merchant, and in the presence of

three sworn surgeons, who dared not use the cautery at that part of the body. But the operation of ligature was not a new operation; it was an old operation by a new, resolute, and skilful hand. It was, however, so good an operation that it took the place of the actual cautery for many ages too determinately, since it put a ban on what we now know is, in many instances, a far better remedy than the ligature.

THE CLOSE OF THE STRIFE.

We draw near the end. The chirurgien of four French kings, Henry II., Francis II., Charles IX., and Henry III., returned to Paris to rest after many troubles. A story raised against him that he had some hand in the death of Francis II. we may put aside as mere venomous scandal, disproved by the confidence and affection of the successor of that unfortunate and short-lived prince. Yet all was not yet untroubled sea for our man of many "voyages."

On August 24th, 1572, was the terrible massacre of St. Bartholomew, in which Ambrose Paré was one of the Protestants proscribed. The King, Charles IX., who, with his mother, the infamous Catherine de Medicis, was the head and front of the barbarity, had no mercy, save for one man whose services he dare not lose. "*Tuez ! tuez !*" was the cry of the king, "but spare Ambrose Paré." And Paré was concealed and spared—spared in the face of all the fabulous stories about his conduct then and there—spared, retaining the reformed faith in which he had been born and bred.

He was spared also to watch and tend the miserable man, his royal master, through all the months of agony and remorse during which that crowned sufferer threaded his way to the death that gave to him the only passage to peace.

Finally, he, Ambrose Paré, barber-surgeon of Laval, was spared to be raised by the successor of Charles IX., Henry III. of France, to the dignity of a Councillor of State, as well as Surgeon-in-Chief; and, so honoured, he chose for his last residence a noble mansion in the Quartier St. Andrew des Arcs, where he could gather together learned, congenial, and admiring friends, as well as beautiful works of nature and art, to his unceasing satisfaction and pleasure. The poet Ronsard wrote lines to him, and tried to render homage by giving the province of Vendôme the honour of his birthplace. The Faculty of Physicians did him the distinction of finding out that he, a surgeon, had written a treatise on fever, and got the local authorities to order the book to be publicly burned; but the order failed. It

then got the Parliament to allow them to use the scissors freely on the wicked book, and, that again failing, it gave him the golden revenge of seeing his whole book pass through threatened fire and steel without a line of injury. And so on until December 22nd, 1590, when, surrounded by all he loved best, he slept the sleep of sleeps, at threescore years and ten and three.

If in those supreme moments the events of the life of Ambrose Paré passed in review before him, as some suppose possible, what a picture was presented to him! Nothing belonging to the sons of medicine would probably come near to it. He might have seen himself as a groom, a gardener, a village barber's apprentice; a barber wandering from town to town; a barber-surgeon in the army, mixing in great battles, running deadly perils, assuming disguises, inventing new methods of surgery, re-introducing old methods. He might have seen himself as a barber-surgeon in Paris, now despised and persecuted by the Faculty of Surgeons, and anon solicited by his persecutors to honour them by joining their fraternity. He might have recalled himself as chirurgien to four of the worst kings of France, and a queen—wife and mother—as bad as they. He might have summoned up the shades of such contemporaries as Rabelais, L'Hôpital the Chancellor, for whom the word *politician* was first coined—and numbers of princes, warriors, nobles, statesmen, who made the history of his time. He might have remembered the origin of the word Huguenot, and shuddered once again at the horrors of that awful massacre which he almost alone of the cheated and doomed citizens survived. He might have closed his dying dream of so wonderful a career by recognising himself as the author of a book which, escaping both fire and steel, was destined to live on, even as he hoped to live, in new and ever-changing spheres of life and honour, to the glory of France and his own immortal fame.

John Mayow, M.D., LL.D. A Neglected Genius

THE saying of Dr. Walshe, quoted in a previous article, on the possession by some men of "the spontaneously active intellectual attribute, which supersedes the necessity for labour, *genius*," was never better exemplified than in the person of the illustrious medical scholar and experimentalist whose life is now before us, John Mayow.

In my student days I had heard this man incidentally spoken of both in the chemical and in the physiological classes. Dr. Robert Willis had also directed my attention to his work, and had told me in what high esteem he was held by the learned Bostock, the author of the renowned and ever-useful book on Physiology, a priceless book for classical study.

But it was not until I chanced to come face to face with Mayow, in the portrait of him published with this biography, that I was sufficiently interested in him to look up carefully the details of his life and work. These completed, I found that in Mayow medicine had a son of sons, a genius, although, as Beddoes calls him, "a neglected genius"; one so great, and at his death so young, that we may compare him, almost, with the poet Chatterton as an illustration of what youthful genius of the highest order may accomplish against time. I am not quite sure, indeed, whether we might not compare him also with Chatterton in another respect; but as this is a speculative point I will not dwell on it. Like Chatterton, he was certainly of poetic mind, although he wrote in crabbed Anglo-Latin prose instead of exquisite English verse.

Of the life of Mayow but little is known. In writing the medical history of Bath for the *Medical Times and Gazette*, in 1864, I found in a local history of the famous old city that he practised there,

and biographer Wood (*Athenæ Oxon.*), recording what he learned long after the death of Mayow, tells us a little about him, but so little that the biographies generally seem to consider him unworthy of notice. Even the *Biographical Dictionary* of last century, so careful not to omit the name of any famous Briton, omits Mayow; and as this work is the basis of all later biographies, they follow with the same omission.

What is known of his birth and early career is that he was descended from a respectable, or, as Wood says, "genteel" family living at Bree, in Cornwall. His parents came to London, and in London John was born, some time in the year 1645, in the parish of St. Dunstan-in-the-West, in Fleet Street. The day of his birth is not known, neither is it known where he received his preliminary education; but on September 27th, 1661, the year after the restoration of Charles II., at the age of sixteen years, he was admitted a scholar of Wadham College, Oxford.

He had not been a very long time a scholar at Wadham College before he became a probationary Fellow of All Souls'. This appointment he obtained through the influence of Henry Coventry, Esq., one of the Secretaries of State, entering amongst the legists, and taking the degree of Civil Law. He may therefore have intended to follow the legal profession, but it is more probable that he took up the LL.D. as a necessary step to the fellowship, there being no arrangement for the fellowship through medicine.

Whatever his original intentions might have been, Mayow studied physic, graduated in it, and very early in life came to London to practise as a physician. He did not join the Royal College of Physicians, and would therefore be an outsider; which would not be favourable to his advancement. In the winter time he seems to have remained in town; in the summer he took up his residence in Bath, and without any doubt carried on medical practice there. While he was in the first years of his practical life, probably before he attained his majority, he began to investigate by the process of experiment, then a new and open field in medical progress, which Harvey had started and one or two had followed, but which had not yet become the accepted and acceptable method. The publication of this experimental work was, nevertheless, well received, if we may accredit Wood, who in his quaint style says he was noted for his practice, especially at Bath, but better by his books, which show "the pregnancy of his parts."

In 1668, when he could not have been more than twenty-three,

or at most twenty-four years of age, Mayow published his first treatise, *De Respiratione*, at Oxford. The following year he published from the same place another treatise, *De Rhachidite*; and in 1673 he published a complete edition of all his works in an octavo of one hundred and fifty-two pages, with four plates, each containing several well-executed figures; an *Elenchus Rerum*, or abstract; a dedicatory poem signed "C. T. Coll. Omn. An. Soc. "; a dedication from the author *Illustrissimo Viro D. Henrico Coventry, Serenissimo Principi Carolo II., Mag., Brit., Franc. et Hib. Regi, A Secretioribus Consiliis & Primario Status Secretario*. The whole work is entitled *Tractatus quinque MEDICO-PHYSICI, Quorum primus agit DE SAL-NITRO et Spiritu Nitro-Aereo. Secundus DE RESPIRATIONE. Tertius DE RESPIRATIONE FÆTUS in utero et ovo. Quartus DE MOTO MUSCULARI. Ultimus DE RACHIDITE. Studio JOH. MAYOW, LL.D., & Medici; Necnon Coll. Omn. Anim. in Univ. Oxon. Socii. OXONII, E Theatro Sheldoniano, An. Dom. MDCLXXIV*. The permission to publish the book was given by Peter, Bishop of Bath and Wells, Vice-Chancellor of the University. IMPRIMATUR PETRUS BATHON. & WELLEN. *Episc., Vice Cancellarius. OXON., Jul. 17, 1673.*

On this volume all the fame of Mayow rests, and by the way in which he has arranged his title page we see upon what part of the work he himself chiefly depended for future recognition. He has arranged the five subjects according to his own idea of the order of their merit, and he has put *De Sal-Nitro* first, and in bolder type than all the rest. The design is as fair as it is modest. It is as if he were speaking from afar to those of us who were to speak of him, to Thomas Beddoes and to me—yes, even to me: "See, my friend, what I conceive to be my most original and enduring thought. I have put it first, for your eye first to fall upon, and I have underlined it thrice, for your mind to study it most carefully."

That Mayow himself had a knowledge of his own greatness to be carried down to posterity in his volume of five essays there can be no doubt, for his dedication to Henry Coventry conveys that thought, although, in the language of his time, he gives all the credit to his patron. But even he, perhaps, no more supposed that he should ever be compared, as he has been, to Francis Bacon, or to his cotemporary, Isaac Newton, who was three years his senior, than that he should be as altogether forgotten for long periods as if he had never been born. Yet both these fates have fallen to his lot.

THE WORKS OF MAYOW.

Leaving for a moment all debate on the value of these essays, it will be most instructive to look at the essays as a whole, and see by what work and quality of work their title to fame survives.

Of the five essays the four first are physiological, the last, on rickets, practical; and, as a broad fact, we may accept, at once, that the four first are all or nearly all that need be mentioned; indeed, but for one deliverance, to which I shall in due course refer, the essay on rickets might be left out of the record for good.

Of the four essays of mark, the second in order of place is the one on respiration, which was published separately in the year 1668. The position this essay holds in the volume is significant, as indicating the line of study which its young author had followed. It is a fair inference that he began his original studies with the subject of respiration, and being led from them to the investigation of the invisible air which is taken in by respiration, he made, through his experiments, what he believed to be a discovery so great and lasting that it claimed priority over all else that he had accomplished.

DE SAL-NITRO.

In the first essay, *De Sal-Nitro*, Mayow divides his subject into fifteen chapters. He supposes that the air is universally charged with a vital substance, *Spiritu Sc. Vitali*, and that this substance is essential for all acts of combustion or burning. The same principle or substance exists in nitre, by this proof, that if the experiment be tried of burning charcoal in a vacuum or under water it will be found that the charcoal will not burn, but if the charcoal be mixed, intimately, with nitre it will burn either in a vacuum or under water. Gunpowder contains sulphur and charcoal; neither of these substances will burn under water, but united with nitre, as gunpowder, the compound will explode if it be dry, or will burn slowly away if it be moistened with water. The reason of this is that the nitre contains the same spirit as that which exists in the air, and which is always necessary in order that combustible things may burn. To this something the name may be given of *nitro-aërial spirit*, or of *saline vital air*, because it exists in the salt nitre; or it may be called *fire air spirit*, because it exists in the air. It is neither acid nor alkaline.



JOHN MAYOW.



All heat seems, he thinks, to spring from the action of this spirit, from the motion of its particles, motion being produced by an impulse. We must, therefore, assume the existence of a refined or subtle constantly moving matter. The fiery or vital particles of the air are not the air itself altogether, but only its subtler part; and nitre does not contain the air altogether, but only this same subtler part, confined as it were in it. Combustion is due to this spirit in contact with other substances, like charcoal and sulphur. Fermentation is another phase of the same contact, and is attended with heat. Combustion itself is fermentation in its most violent form. The rust of iron is produced by the action of the particles of the spirit of the air acting upon the "metallic sulphur" of the iron, and in effect is the same as if the iron had been acted on by an acid.

In these observations we see that Mayow had a clear idea of the presence in the air of something which was a part of the atmosphere and which combined with other substances, producing, according to combination, heat, active combustion, fermentation, rust. We, knowing more than he, call this something *oxygen gas*; he, seeing as we see, that the same substance is in nitre and in the air, called it, naturally enough, *nitro-aërial spirit*.

This was his preliminary work; he proceeded next to curious and important results by the experimental method. He had observed when a cupping-glass is placed on the surface of the body that soon after the lamp is withdrawn from the glass the glass adheres firmly to the skin, and the skin rises up to fill a vacant space. In this experiment he assumed that a portion of the nitro-aërial spirit in the cupping-glass before it is applied is used up in the combustion from the lamp. In this way a vacuum is formed; the skin rises to occupy the space, and the suction makes the glass adhere firmly to the skin. The observation led to a new experiment.

By means of a drawing to make quite clear the details stated in his report of the experiment, he shows to us that he placed a lighted candle in a basin or trough, and surrounded it with water up to a point a little below the lighted wick. He next inserted a syphon tube in the water in such a way that the two limbs of the tube stood upright above the water, while its lower rounded part rested on the floor of the basin. He then covered the burning candle with an inverted cucurbit—a pear-shaped bell-jar—letting one limb of the syphon stand outside it, and letting the mouth of the jar descend gently below the level of the water. The syphon tube permitted the air to escape as the jar descended, and the candle was left burning

in the confined air of the jar. Here was an imitation of the cupping-glass, and here was a test of his theory. If the candle by burning would extract nitro-aërial spirit from the enclosed air, the water would rise in the cucurbit to fill the space. The water did rise, and the space was occupied. In a later stage he measured how much space was lessened by combustion in a closed jar, and calculated it was one-thirtieth part of the whole: not by any means a bad measurement, considering that he had no knowledge about the carbon-binocide that was formed, or how to absorb and fix it.

In another experiment he repeated what he had done in a different way, so as to avoid expansion by the sudden application of heat from the flame of the candle. Instead of putting a candle into the bell-jar under water he suspended in the jar a plate on which he had laid some easily-combustible substance. This substance he fired in the bell-jar by means of a burning glass—a most ingenious device; and again he observed that from the combustion there was loss of the nitro-aërial spirit, with an ascent of water into the jar to fill up the space which the spirit had previously occupied.

In a third experiment in this series he inquired if air would feed combustion after the nitro-aërial spirit had been withdrawn from it. He seems to have placed, as before, some combustible substance on the plate in the bell-jar suspended above a burning candle; to have suffered the candle to exhaust the spirit, and then to have attempted to fire the combustible substance with his burning glass; but without avail, because in the absence of the spirit there could be no combustion. No spirit, no fire!

VITAL AËRIAL SPIRIT.

So much for the combustion of flame. What about animal combustion, the *calor vitalis*, the heat of life? Does the animal combustion submit itself to the same test as the candle? For the purpose of putting this point to experimental proof, Mayow filled a jar with water and tied over the mouth of the jar a sheet of bladder. He next placed a live mouse in another and smaller glass jar containing common air, and inverted the jar so as to let its open mouth fit closely upon the moist surface of the bladder, the mouse itself resting on the same membranous surface. If now the mouse used up any of the nitro-aërial spirit in the upper bell-jar, the bladder ought to rise in the upper jar just as the skin rises in the cupping-glass, and at the same time the vital fire of the mouse ought to go

out. Both events did occur. The mouse was soon raised upon a rounded elevation of bladder and its animal fire was extinguished. It ceased to live.

In a second experiment of the same nature he varied the details by placing a mouse in an inner chamber surrounded by water and covered with a bell-jar. He now saw the water rise in the outer jar as the part of the air absorbed by the mouse was extracted ; and, measuring the absorption by the lost space, he concluded that one-fourteenth part was taken up by the breathing animal before the extinction of its vital fire.

Again, he compared the attraction, if I may so say, of the animal fire for the vital air by the attraction of the common fire for the same air ; and found—what I, by another form of research, have also found independently—that an animal will, for a short time, live in an air exhausted so far that the combustion of a taper or candle will not take place in it. In other words, that an animal will live longer than a candle in the same volume of common air in a closed receiver.

Once more, he discovered that if two animals be placed in a closed receiver filled with air, the one animal in the lower, the other in the upper part of the receiver, the animal fire will go out soonest in the animal in the upper part.

Putting together all these facts, so familiar to us of this day, so startling and novel in his day, Mayow concluded that animals live in air by the process of constantly extracting from it a vital part or spirit, which, being absorbed by them, feeds the animal flame and sustains the animal heat. The conclusion thus arrived at led him easily enough to study the mode of the absorption. How was the vital aërial spirit taken up?

The ideas prevailing in his day that the inspired air is wanted to keep open the air passages, to cool the heart, to sustain a fermentation in the heart, or to impart an acid vapour to the blood in order to excite the motion of the heart—a view which Sir Isaac Newton appears to have held—were not satisfactory to Mayow, because insects cannot live without air. He saw that air enters the lungs, primarily, by its own weight, and is expelled by an act of the body, the act of expiration. He inferred that in the lungs the air loses some part of itself—its nitro-aërial spirit ; and he came to the bold but correct view that the part lost was absorbed by the blood, and was carried round the body with the blood to keep up the animal fire. With the microscope he essayed to see the tubes in the structure of the lungs by

which the air might be directly conveyed. He saw very fine tubes, but without affirming that these were the conducting channels, he still affirmed that the part of the air which is absorbed or lost enters the blood. A dog that lay panting and struggling to breathe ceased to pant when blood charged with nitro-aërial spirit was driven by a syringe over the lung from the right into the left side of the heart.

The office of the lungs is to separate the nitro-aërial spirit from the air and convey it to the blood, and the vital air so conveyed by the blood to the heart stimulates the heart to motion. It also changes the colour of the blood, making the venous blood of bright red hue.

In further support of his argument Mayow contended that the gills of fishes were the lungs of fishes ; that the water in which fishes float contains, in its pores, the vital air in sufficient quantity to support the breathing of fishes ; and that the vital air passing over the gills is absorbed by them, and conveyed from them to the blood. He showed, moreover, that when water is deprived of the vital air it will not support the life of the fish.

One step more. The placenta plays, he believed, a similar aërating part to the foetus in utero, and air passes with the blood of the mother to the foetus. He was, therefore, as Bostock expresses it, "the first who entertained a correct opinion respecting the use of the placenta as an organ supplementary to the lungs" : and who "also extended his views to the chick in ovo, although he had not a very clear conception of the manner in which the nitro-aërial particles were obtained by the blood of the foetus or by the fluids of the egg."

MECHANISM OR RESPIRATION. MUSCULAR MOTION. FERMENTS.

Engaged in observations on the respiratory function, it was natural enough for Mayow to study the mechanism of respiration. He was singularly happy in this research. He described most carefully the two layers of the intercostal muscles ; argued that both sets by their contraction elevate the ribs and increase the capacity of the thorax ; and that the diaphragm, by its contraction and relaxation, regulates the capacity, increases the thoracic space by descending into the abdomen, and reduces the space by arching into the thorax. His illustrative drawings on these points are excellent. In the fourth of his essays, *De Motu Musculari*, Mayow displays a good knowledge, for the time in which he lived, of the structure of muscle.

He considered that the transverse fibrils inserted in the greater fibres perform the chief office in contraction of muscle, but that the nitro-aërial spirit is again necessary for the production of motion.

In this part of the work he has a special chapter on the ferments of the stomach, the pancreas, and the kidneys ; with a hypothesis that all the secretions are due to fermentative changes, each special according to its kind. He treats also fully on what he calls the animal or vital spirits, and brings into this division a free notice of the vital function of the nitro-aërial particles or subtle portion of the air.

RICKETS.

The last essay, on rickets, is, as before stated, the one practical essay, testifying to the physician rather than to the physiologist. It opens with a tribute to Glisson—better known to us in these days as the anatomist who described the capsule which bears his name, *Clarissimus Glissonius*. Then he gives the diagnosis of the disease, the symptoms, the cause, the cure. In treating of cause or causes one good suggestion is made. The cause of the disease is, he thinks, nervous exhaustion. The nerves, not less than the blood, contribute to nutrition—*Nervi ad nutritionem conducunt*—and the failure in rickets is not from the brain but from the spinal cord. The history of the disease and its causation forms a striking contrast to the *Methodus Medendi*, which, directed to remove the obstruction of the medulla spinalis, is beyond measure perplexing and complicate, one prescription alone being made up of eleven ingredients. I leave this part of Mayow's labours to fate, with this one further observation, that he seems to look upon rickets as a comparatively new disease in the western counties of England, a disease of forty years previous to his time.

PHYSICAL SCIENCE.

Engaged principally in pursuit of physiological discovery, Mayow had his time well occupied and filled by that work alone. Still, by keeping his mind open to receive every kind of friendly hint from nature, although outside his own dominion of conquest, he added not a few new and important facts and theories to physical science. His drawings as well as his text, for example, clearly tell us that he invented and used a pneumatic trough and collected and retained gases. He filled a globular glass bottle with water ; he inverted the

bottle, with the mouth of it open under water in a trough ; he passed portions of iron into the neck of the bottle ; he acidulated the water with spirit of nitre, and filled the bottle with the air or gas generated, in bubbles, by the contact of the acidulated water with the iron. In short, he decomposed water and collected hydrogen. He supplies also a drawing in which two bottles were used, one for the generation, another for the collection of the gas that was evolved. Unfortunately for his fame in the field of pneumatic chemistry, he did not examine the gases which he collected in order to test their physical qualities. He showed that they could be collected and removed from place to place, but he left what remained of the inquiry to the independent genius and industry of the true founder of the pneumatic method, Joseph Priestley.

In speculative science Mayow also took a prominent part. He held that motion is the result of an impulse communicated to the rigid subtle particles of the nitro-aërial spirit. The particles would never move of themselves, but they are moved ; and by that movement, in mass, we get what may be called the phenomena of motion, and of heat which is exalted motion. Such, it seems to me, is the idea he conveys, and by it tries to describe that condition of rigid bodies called elasticity. The particles of air, he contends, are compound and rigid. Light is not an effusion, but an impulse through the nitro-aërial particles, or an impulse through a medium ; a step further and he would have forecast the vibratory hypothesis of light and of the ether of space.

Respecting the heavenly space, however, he had another view. To his mind the sun is an immense chaos of nitro-aërial particles, agitated by a rapid and incessant motion. The air or spirit from the sun becomes cooler and cooler as it approaches the earth, so that in the middle region, between the earth and the moon, the emanations constitute the region of absolute cold. But from the earth the air rises to the utmost region of the element of heat, then descends and is deflected to the north pole by the motion of air from the equator, and, sweeping back over the surface of the earth from the pole towards the equator, gives us the north wind.

One step more, and out of the half true ideas which floated in his brilliant mind, with a little knowledge about the southern hemisphere, Mayow had discovered the cause of the trade winds. How near he was to this induction is shown by the observation he makes that, in the manner above described, a circulation of air, essential to life, is maintained on the earth.

Not less interesting than this hypothesis of the trade winds is another respecting the cause of water-spouts, which he attributes to a vertical motion of the air, and which he illustrates by a plate, showing two figures, in which the vertical lines, of motion in spiral form are well depicted.

One last speculation, and I bring the physical suggestions of Mayow to a close. He assumes that the firmament is of blue colour, because we look above us into a space or region where motion of particles is most slackened. All faint flames, he tells us, are of blue colour, because of the slower motion of the particles in the combustion.

ESTIMATES OF MAYOW AS A SCIENTIFIC DISCOVERER.

To many modern readers the name of John Mayow will be a new name ; and it is very curious, in looking at the comments which have been passed on him, that while he has never retained a permanent rank as a discoverer he has appeared in the most remarkable manner by fits and starts, like a variable star in the great firmament of science. In the last year of the last and in the first year of the present century the pages of the admirable *Medico-Physical Journal* held communications from Dr. Lubbock of Norwich, Dr. Yeats of Bedford, and Dr. Stokes of Chesterfield, in which the claims of Mayow, called forth by the writings of Beddoes, were very freely handled. From these and from other sources I could fill a volume with controversial details, in which Mayow would be presented on one side as standing on the same level with Newton, and, on the other side, as being a mere copyist from a preceding writer named Bathurst, or from his cotemporaries Lower, Hooke, Thurston, and Boyle. A paper in the *Transactions of the Royal Society* depreciates him to uplift Boyle ; and Scheele speaks of him sneeringly as one giving "obscure hints" on the composition of atmospheric air.

But no unprejudiced mind that is familiar with experimental pursuits, can for a moment doubt the originality, the truthfulness, the genius of this man. The train of experiment which he invented and carried out, the correctness of the results, the faithfulness of the pictorial illustrations as well as of the text, the startling and brilliant inductions which nothing except experiment could have suggested, all go to prove that John Mayow stood alone in his greatness, a master, young in science, but so old in skill and accomplishment that whatever he touched was illuminated with new light.

I can have no doubt that he foresaw oxygen gas and some of its most important uses. He did not call it oxygen, he called it *sal-nitro*; by which he meant something in finely-divided particles or atoms. He did not call it a gas, but he called it a spirit, which is the same thing; for gas comes from *geist*, *geist* is ghost, and ghost and spirit express, alike, any invisible something that produces a phenomenal and definable act.

THE DEBT TO NATURE.

John Mayow, Wood informs us, paid his last debt to nature in an apothecary's house bearing the sign of the "Anchor," in York Street, near Covent Garden, in the liberty of the city of Westminster, in the month of September 1679, in his thirty-fourth year. He had been married a little before, not altogether to his content. He was buried in the church of St. Paul's, Covent Garden.

The portrait of Mayow speaks of gentleness, honesty, intelligence, sadness, genius. Dr. Yeats, in 1799, wished for him that the laurel of merited reputation which the fatigues of discovery wreathed about his brow might continually flourish unfaded. To which I, eighty-eight years later, heartily add:—*So may it be.*

John Arbuthnott, M.D., F.R.S., the Medical Scholar

THE life-history of the world medical is as peculiar for the variety of talent which it has produced, as for the choiceness and vigour of its mental qualities. There have been in medicine men of every form of thought and expression: poets, from the Apollo who was god of physic as of song; voyagers of Bass Straits immortality; travellers striking out alone into the heart of Africa to win that mighty continent for civilisation; historians of Smollett type; natural scientific inquirers of every possible cast: botanists, naturalists, chemists, geologists, astronomers; antiquaries, wits, novelists, mechanics, mathematicians, philanthropists; and political philosophers of all schools, from Bernard de Mandeville to Joseph Hume.

But although medicine, in her catholicism of intellect, has fostered so many and varied types of learning and character, she has generally had one special person for the exhibition of one special gift; while, as if to be isolated more thoroughly from the world, many of her greatest men have, in the study of the higher problems of science or in the pursuit of noblest literature, sunk their craftsmanship and left the guinea-fishing business altogether to their smaller and more selfish kindred. In England, for one country at least, there has been so strong a prejudice against the professional skill of "learned" doctors, that the physician who has written a clever poem or made a great discovery in science, geography, or aught else, has too often written, therewith, his last prescription. The shock administered to the public by Charles Bell, whenever he announced a new physiological argument, was so severe in its reaction upon his practice, that he was obliged to administer *quamprimum* a "practical"

restorative in the shape of a clinical lecture ; and the fate of poor Goldsmith, who was before the era of the clinical lecture restorative, every one knows.

The most absurd rule has its exceptions, and this rule, which regulates the estimate of medical skill, has once or so had its course, for a moment, broken.

The most marked instance of this kind is met in the life-history of the man now on the easel—John Arbuthnott—a man who during a long life spent in the exhibition of mental traits as varied as they were powerful, while tossing in the whirlpool of political debate, while classic-serving, antiquarianising, science-seeking, satire-writing, wit-making, and fun-distributing, managed, by hook or by crook, to write prescriptions, the physic of which the people and even royalty swallowed, with all good breeding, and with infinitely more faith in its efficacy than ever satisfied the conscience of the renowned prescriber.

BIRTH AND PARENTAGE.

Arbuthnott, though a London physician, emigrated, as many other eminent men of his profession, before and since his time, have done, from Scotland. He was born at Arbuthnott, near Berrie, a small town in Kincardine, not far from Montrose, in the year 1667, in the month of April, day of the month uncertain. I was deeply indebted to the Rev. R. M. Spence, minister of Arbuthnott in the year 1856, for many of the particulars in this part of my narrative, especially for the correction of a mistake by the biographers regarding the father of Arbuthnott, whom they have confounded with that famous non-juring divine, Principal Alexander Arbuthnott, whom James the Sixth of Scotland and First of England confined to his college for disobedience. Our Arbuthnott's father was, it is true, named Alexander, but was a different man. He was the minister of Arbuthnott in his day, but whether he was related to the noble family of Arbuthnott, the descendants of which are still in our peerage, is not very certain. Mr. Spence, inquiring for me on this point at Arbuthnott House, was kindly assisted by the Hon. Captain Arbuthnott in ascertaining whether anything could be found relating to the Doctor or the Rev. Alexander. The inquiry was fruitless.

The father of John Arbuthnott, from whatever family he sprang, was, as before said, a minister of the village of his name. He, too,

like his former namesake, was rebellious : he refused to comply with the Presbyterian system, which was restored at the Revolution of 1688, and was obliged, in 1690, to resign his charge. He retired to the castle of Hallgreen, near Berrie, in the neighbourhood of which he possessed, by inheritance, the small estate of Kinghornie. John Arbuthnott was the eldest son of his family, his mother being one Margaret Lamy, of Muryton. He had one brother, at least, whom we shall have before us a little later on.

The manse in which Dr. Arbuthnott was born is not standing, but the present manse is built on its site. In the garden of the present manse are two yew trees, said to be from four to five hundred years old, which must have been in existence when Alexander Arbuthnott was minister, and round the trunks of which his boys, perchance, often gambolled. The church, a very ancient building, where the said father preached and the boys listened, remains, a curious relic of Roman Catholic times, but bearing in many mutilations the marks of that hot-brained zeal of Knox, which led, as Mr. Spence happily says, him and his associates, "while they reformed religion, to deform its temples." The church and manse stand in a prettily wooded valley, through which the little river Berrie runs.

Hallgreen Castle, to which Arbuthnott's father retired with his sons after his ejection from his cure, still stands. It is situated on the sea-shore in the neighbouring parish of Berrie, and about three miles from the Arbuthnott manse. At the time when the Arbuthnott family retired to it, it belonged to a Mr. Ruitt. In 1856 it was the property of Mr. James Farquhar. The estate belonging to Alexander Arbuthnott at Kinghornie, which, no doubt, descended to him as the younger son of the old Arbuthnott family, became part of the property of the Baroness Keith.

MEDICAL GRADUATION.

According to an anonymous biographer who wrote from Glasgow in 1751, and from whom most succeeding writers have taken their cue, John Arbuthnott's first step in life was to the University of Aberdeen, where, as the story runs, he studied and graduated in medicine: This statement is founded on error, for to the University of St. Andrews is due the honour of being the *alma mater* of our brilliant scholar. The evidence for this statement is clear. In the British Museum there is retained, among other of Arbuthnott's works, the title-page and first text page of a graduation thesis on

animal secretion, with an additional dedicatory note, which I subjoin in perfect copy in the footnote.*

It will be observed that this document does not bear the date of the year, and is, therefore, in so far, imperfect. To obtain further facts, I wrote to my late friend Dr. George Day, when he was Chandos Professor at St. Andrews, and through him obtained the assistance of the learned secretary to the University, the late Rev. J. M'Bean, M.A., who, after a careful research in the records of the University, found not only the registries of the day when Arbuthnott graduated, but also his autograph, which, with the registries, I present to the reader as I received them:—

"11mo. Septembris, 1696.

"*Quo die generosus hic, cujus nomen infra subscribitur Gradum Doctoratus in Medicina (præstitis præstandis) honorem hunc conferente R. D. McAlexr. Monro D. prælecto, Coll. S. Salvatori nostri ac gradum promotore.*"

"11mo. Septis., 1696.

"*Quo die generosus hic cujus nomen infra subscribitur medicinæ studiosus (præstitis præstandis) in album Academiæ receptus est.*

Jo: Arbuthnott

"*Georg. Hamilton, Coll. Leonard, Principalis.*"

* THESES MEDICÆ DE SECRETIONE ANIMALI

quas

Faente Deo Opt. Max.

Ex autoritate

D. D. Georgii Hamilton,

Principalis Coll. S. Leonardi

In Academia Andreæ-politana,

Et ejusdem Academiæ Rectoris magnifici

Nec non

Amplissimi Senatûs Academici Decreto,

Pro Gradu Doctoratus in Medicina Consequendo

Publico examini subjecit

Johannes Arbuthnott Auct. et Resp.

In Scholis Marianis.

Ad diem 11 Septembris, 10 a.m.

Adolescenti ingenuo

Edwardo Jeffreys,

Collegii Universitatis

Apud

Oxonienses

Superioris ordinis commensali

Theses hasce

D. D. Auctor.



Jo. Arbuthnot

From oil painting by Jery is in the possession of the Royal College of Physicians. Autograph—*ft. 1000*—
from Register of St. Andrews University, September 11th, 1600.



It thus comes out clearly that Arbuthnott graduated on the 11th of September, 1696—*i.e.*, in his thirtieth year—and that the graduates of St. Andrews have historical right to claim him as their brother.

SETTLEMENT IN LONDON.

A few years after the ejection of their father from his pastorate, the two brothers Arbuthnott left home to carve their ways through the world. The younger one went on the Continent. The elder, Dr. John, with his new university honours fresh upon him, made his way first to Doncaster, and then to all-absorbing London. Both brothers embraced their father's political principles.

On reaching London, the Doctor was received into the house of a Mr. William Pate, a learned woollen-draper, and commenced to work for the bread and cheese of this life by teaching mathematics, in which he was a proficient. At this period, Dr. William Woodward, a physician and geologist, brought out a work on the *Natural History of the Earth*, which created in its day almost as great a furore as *The Vestiges of Creation* has in ours, though of a somewhat different character. Woodward was a remarkable man, and after his death was satirised for his practice of administering to his patients whey and oil in immense quantities. He died in 1728, and left a valuable collection of fossils to the University of Cambridge, with an endowment for a chair of geology. Woodward, in his work above named, dwelt on the successive deposition of strata, and invented a theory about the formation or structure of the earth on this basis. In 1697 Arbuthnott brought out his first literary work in answer and in opposition to Woodward. The essay was entitled *An Examination of Dr. Woodward's Account of the Deluge*. It is a scholastic treatise, and written in good tone. The philosophy of Steno is here compared by Arbuthnott with that of Woodward, to the advantage of Steno, while an abstract is added of a book by Angostina Scilla. Whichever of these combatants might be right, Arbuthnott's work did him immense service, and brought him early into public notice. He looked out now for medical practice as an additional means of subsistence, and three years later enriched literature by the publication of an admirably argumentative work on the *Usefulness of Mathematical Learning*.

The essay on mathematics was written in the form of a letter to a gentleman in Oxford. It bears date November 26th, 1700. In it

the author argued for the application of mathematics, on the ground that the study of this science accustoms the mind to attention, gives it a habit of close and demonstrative reasoning, and frees it from prejudice, credulity, and superstition. It praises Borrelli and Steno for their researches, and says that the only organ of the animal body whose structure and manner of operation are fully understood has been the only one which the geometers have taken to their share to consider. The organ he refers to is the eye, the use of which, in his opinion, Kepler first found out solely by his geometrical labours.

Arbuthnott was now fairly before the world. He had evidently been married some time, since his second son, George, was born in 1703. Who Mrs. Arbuthnott was is not recorded, but we gather from his letters that she was an excellent wife, and that their wedded life was as happy as it was distinguished. In 1704, on St. Andrew's Day, the Fellowship of the Royal Society was awarded to Arbuthnott. Soon afterwards an accident threw him into the favour of royalty. Being at Epsom, at a time when Prince George of Denmark was also there, he was called to see the Prince, who was taken ill unexpectedly. His skill, attention, and learning, fascinated the Prince so much that in the next year (October 30th, 1705), by special command, and in consideration of his good and successful services to Prince George, Arbuthnott was elected Physician Extraordinary to the Queen, Anne. In this same year 1705—April 16th—he was created Doctor of Medicine, Cantab., and later on an Honorary Fellow of the Royal College of Physicians of Edinburgh.

I find no record of moment concerning Arbuthnott from this time until the year 1709, when, upon the indisposition of Dr. Hannes, he was appointed, in the month of November, Physician in Ordinary to Her Majesty, and went to reside in a house in St. James's. In the next season—April 27th, 1710—he was made a Fellow of the Royal College of Physicians; and in the same year he read an interesting paper at the Royal Society. This paper will be found in vol. xxvii. of the *Transactions*, p. 186. It seems to have been read at an October meeting, and is entitled, *An Argument for Divine Providence, taken from the Constant Regularity observed in the Births of Both Sexes*. It occupies five pages. The argument is, that upon the exact balance maintained between the numbers of men and women, it is provided that the species shall never fail nor perish, since every male has his female of proportionable age. Taking, as a line of demonstration, a mathematical view of his subject, the further conclusion of the author is, that the equality of males

and females is due to "art," not "chance," there seeming to be no more probable cause for the equality "than that in our first parents' seed there were at first formed an equal number of both sexes." There is, however, he admits, a slight difference in the numbers of the two sexes; for inasmuch as the mortality of males is greater than that of females, so more males are born than females; while the equality of men and women is well nigh perfect. In illustration of the regularity of the sexes, the paper included a table of the births of the two sexes in London from the year 1629 to 1710.

The practical and social result to which Arbuthnott came was this: "That polygamy is contrary to the law of nature and justice, and to the propagation of the human race; for where males and females are in equal number, if one man takes twenty wives nineteen must live in celibacy, which is repugnant to the design of nature."

It will be seen that in this inquiry Arbuthnott anticipated a modern statistical disclosure. We shall see in the sequel that he anticipated some other important scientific works, which are thought specially to belong to our own time.

THE MAN OF LETTERS.

The Court physician, in his St. James's residence, was now advanced to a position which he had scarcely looked for in his most hopeful hours; and the happiness of his life was not a little increased by the many valued friendships which he had the good fortune to secure. His closest friends were Pope and Swift. They met nightly, a glorious party. Arbuthnott led the witty and classical vein, Swift the austere and heavy satirical, Pope the sharp and sarcastic. Meantime, they were all earnest friends. Swift says of Arbuthnott, "He has more wit than we all have, and more humanity than wit;" and referring to his professional skill, thus expresses himself:—

*"Removed from kind Arbuthnott's aid,
Who knows his art, but not his trade,
Preferring his regard to me
Before his crotchet or his fee."*

The only reflection on his incapacities is, that he cannot walk. "He is a man that can do everything but walk." This is Swift again, in introducing the Doctor to Pope.

In those days an important political club existed, of which Harley,

Earl of Oxford and Lord High Treasurer, Swift, and Arbuthnott were members. They were sixteen in number, dined weekly at each other's houses, supported the Tory interests, and called themselves brothers. Hence Arbuthnott, in writing to Swift, calls him brother. Harley he styles as "the dragon."

The letters of Arbuthnott to Swift at this period are very interesting. He tells how he attacked Lord Bolingbroke for wine for Swift, how he will pay bills for him on demand, and explains his own annoyances at Court. Mrs. Arbuthnott, with a woman's usual anxiety, wishes that Swift were married.

Thus these wits and critics went on gaily; they got up clubs which bore the name of the proprietor of the house of meeting; they laughed heartily at the absurdities of the world in general, and of the literary world in particular; and they plotted a great work, a satire, *On the Abuse of Human Learning in every Branch*. The first part was drawn out under the title of *Memoirs of Martinus Scriblerus*; it was couched in the Cervantes style, and was intended to be in no way deficient in pepper.

In a letter from Arbuthnott to Swift, dated Kensington, June 26th, 1714, he says, referring to *Martinus Scriblerus*: "Pray remember Martin; he is an innocent fellow. The ridicule of medicine is so copious a subject that I must only here and there touch on it. I have made him (Martin) study physic from the apothecaries' bills. Martin is made to determine the question of the weight of ancient men by the doses of physic that were given to them. There is a map of diseases for the three cavities of the body and for the external parts. Ratcliffe is made to rule this empire. Another point of satire is taken from the Greek physicians who set up a sensitive soul as first minister to the rational. This is the Archæus of Helmont and the Microcosmeter of Dolans. These ruling powers have their genii under them, who are made to fight."

In the same letter he made a weak attempt at poetical witticism, got up on going to bed. Think of any other man than Arbuthnott writing such stuff to the violent Dean!

POETRY ON DUST.

"The dust in smaller particles arose
Than those which fluid bodies do compose;
Contraries in extremes do often meet,
'Twas not so dry that you may call it wet."

Only the first part of the *Memoirs of Scriblerus* appeared, and

this many years afterwards. But in the project was embodied much of the subject-matter of Swift's *Gulliver* and Pope's *Dunciad*. Johnson, commenting on the *Memoirs of Scriblerus* in his *Life of Pope*, expresses no regret that the design was never completed. Speaking of the published part, which even in his time was well nigh forgotten, he says: "If the whole may be estimated by this specimen, which seems to be the production of Arbuthnott, with a few touches perhaps by Pope, the want of more will not be much lamented, for the follies which the writer ridicules are so little practised that they are not known; nor can the satire be understood but by the learned; he raises phantoms of absurdity and then drives them away. He cures diseases that were never felt. For this reason, this joint production of three great writers has never obtained any notice from mankind; it has been little read, or when read has been forgotten, as no man could be wiser, better, or merrier by remembering it. The design cannot be of much originality, for, besides its general resemblance to *Don Quixote*, there will be found in it particular imitations of the history of Mr. Ouffle."

The design of the *Memoirs* was broken up, owing to the altered position of matters on the death of Queen Anne, August 12th, 1714. Arbuthnott had successfully treated the Queen soon after his appointment as her physician, and had been complimented for his skill by Gray in the prologue to the *Shepherd's Week*. He must also have won the favour of the Queen herself, since he had received from her the post of physician to the Chelsea Hospital (November 12th, 1713). He attended her now through her last illness, and Mead was called in consultation. His letter to Swift about his "dear mistress's" death is most touching. "Sleep," he says, "was never more welcome to a weary traveller than death was to her." He writes this letter "with tears in his eyes."

On the succession of George I., Arbuthnott lost his Court appointment, and was obliged to remove from his house in St. James's. Mead gained the royal favour, and was made Court physician; but the friendship between him and Arbuthnott was in no way changed by the change of circumstances. Both were true men and honourable.

Dispirited by his misfortune, Arbuthnott now paid a visit to Paris to see his brother, who resided there. He stayed six weeks in Paris and six in Rouen, leaving his two girls in France with their uncle, "which was his chief business." He returned to London and took a house in Dover Street, "hoping still," he writes, "to

keep a little habitation warm in town, and to afford half a pint of claret for his old friends."

Arbuthnott was not the man to be long dispirited; he resumed practice in his new house, and had the confidence of the public and the profession freely bestowed on him. There is no note whatever of the amount of his income, but his practice seems to have been chiefly among the upper classes. Lord Chesterfield prided himself on being not only his patient, but his friend. He retained the friendship of his old acquaintances, Garth, Freind, Swift, Pope, while the amiable poet Gay presented himself as an additional comrade. Friends met at his house frequently, and little country parties were got up, of which the Doctor was always chosen as the captain, from his seniority. He was very exacting in his orders on these occasions, and poor Pope had a great deal to put up with; even his nightshirt had to be smuggled, so that he might be sure of having it with him.

No adventure of any moment ever occurred on which Arbuthnott did not write a pleasant essay. These productions were all written in a great folio paper book which he kept in the parlour. So little, however, did he care for them after they were put together, that often, when he was writing out the last sheets of his folio, his children were tearing out the first, without hindrance, for use in the manufacture of kites. Thus what to us now might be most valuable historical documents were scattered literally to the winds.

In 1715, conjointly with Gay and Pope, Arbuthnott brought out a comedy called *Three Hours after Marriage*. The piece was brought on the stage in 1716, to prove a dead failure. The plot was bad, and the sentiment not superexcellent. The next year Captain Brevall, a man who had done much service for the Duke of Marlborough, wrote, under the cognomen of Joseph Gay, a farce called the *Confederation*, with a ridiculous caricature print of the authors of the *Three Hours after Marriage* comedy. Pope, never forgetting an attack, trounced poor Brevall for this in the *Dunciad*—"Brevall, Bond, Besaleel, the varlets caught."

In 1717 the poet Prior got into political and pecuniary difficulties. To assist him the kind hand of Arbuthnott was foremost. In combination with Pope, Gay, and Swift, he got up and carried out a subscription for the publication of the poet's works.

About the year 1720 Hogarth, then a young man, entering one evening into Button's coffee-house, fell athwart a distinguished trio—Arbuthnott, Garth, and Pope. Charging them at the point of his

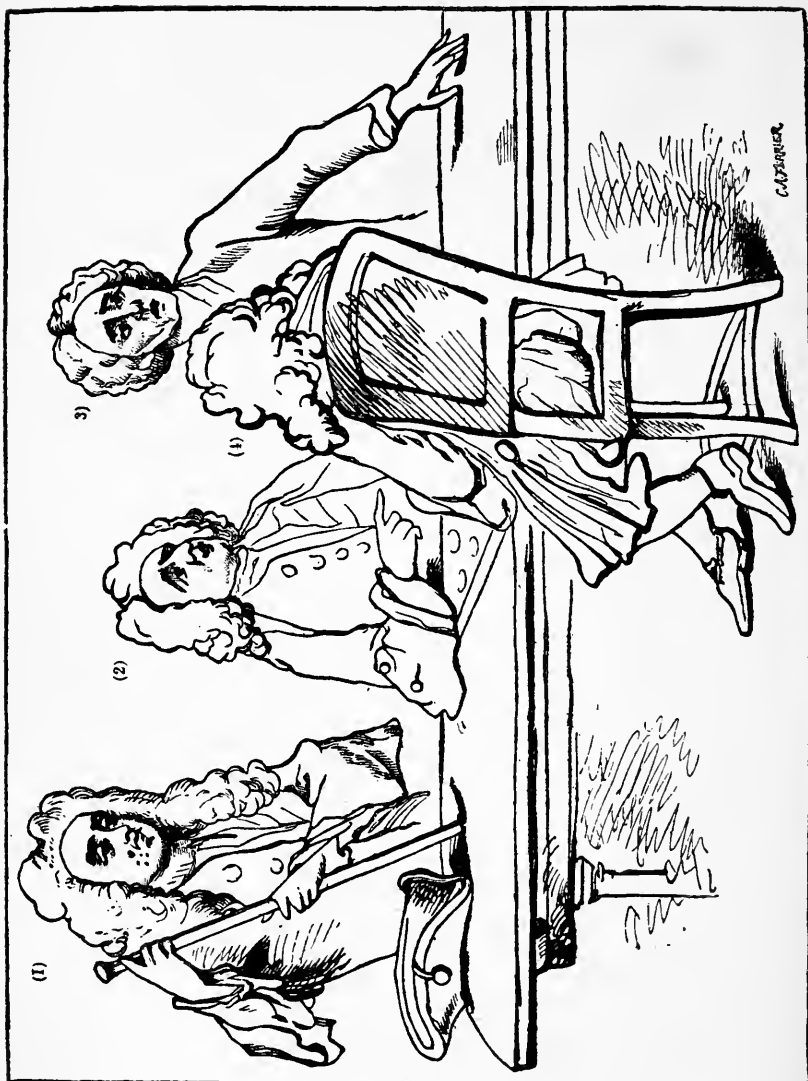
pencil, he brought them before the world in inimitable caricature. My friend, the late Mr. Squibb, of Montague Place, lent me from his valuable picture collection a copy of this Hogarthian work. I am thus enabled to introduce to my readers the hero of this piece and his immortal coffee-house companions (see next page). The figure of Pope is to the right of the sketch; the seated figure is Arbuthnott; Garth stands to the left, holding his gold-headed cane. Hogarth himself sits with his back to us, as grand listener and draughtsman.

I have traced out the career of Arbuthnott to the year 1720-21. His health being indifferent, and his brother having come over from Paris, the two brothers started off for Bath in the autumn of 1722. Pope hereupon has a characteristic letter to his friend Digby:—

“September 1st, 1722.

“Dr. Arbuthnott is going to Bath, and will stay there for a fortnight or more. Perhaps you would be comforted to have a sight of him, whether you need him or not. I think him as good a doctor as any man for one that is well. He would do admirably for Mrs. Mary Digby: she need only to follow his hints to be in eternal business and amusement of mind, and as active as she could desire. But, indeed, I fear she would outwalk him, for, as Dean Swift observed to me the very first time I saw the Doctor, *he is a man that can do everything but walk*. His brother, who is lately come to England, goes also to the Bath, and is a more extraordinary man than he, worth your going thither on purpose to know him. The spirit of philanthropy, so long dead to our world, is revived in him: he is a philosopher all of fire, so warmly, nay, so wildly in the right, that he forces all others about him to be so too, and draws them into his vortex. He is a star which looks as if it were all fire, but is all benignity, all gentle and beneficent influence. If there be other men in the world that would serve a friend, yet he is the only one, I believe, that could make an enemy serve a friend.”

Excepting the fact that on the 30th of September, 1723, he was chosen Censor of the College of Physicians, we glean but little record of Arbuthnott until 1727, when we find the same Collegiate body numbering him among their “elect,” on October 5th, and listening in full conclave soon afterwards to a Harveian oration, delivered in his classical style. The oration, as a matter of course, was loud in its praises of Harvey, whom the orator compared as a philosopher with Newton, and whose actual labours he very clearly



• [GANTH (1), ARBUTHNOTT (2), POPE (3), AND HOGARTH (4) AT BUTTON'S COFFEE HOUSE, 1720.]

comprehended and defined. Various points and facts in the history of our science were also touched upon with masterly care. The views of Michael Servetus, of Realdus Columbus, and of Cesalpinus, on the circulation of the blood, were not forgotten, but were represented as buried or as lost until the true man came to announce his discovery, and to set the seal on his mission in the Lecture Hall of the Royal College.

The oration is remarkable in that it contains a suggestion for keeping a journal of the weather, and of the prevailing diseases as influenced by meteorological changes. This idea was carried out soon afterwards by Professor Mussenburg, and by a society of learned and ingenious gentlemen of the profession in Edinburgh, who met to discuss the history of acute diseases as depending upon the constitution of the seasons.

In this same year, 1727, Arbuthnott brought before the world the most classical, if not the most useful of his works: *The Dissertation on Coins, Weights and Measures Explained and Exemplified*. This work, as its author states apologetically, is one of labour more than of judgment. "He proposed to get no reputation by it, and he hoped to lose none." The book was dedicated to the King, in a poem written and signed by Charles Arbuthnott, one of the sons of the Doctor, then a student of Christ's College, Oxford, who afterwards entered the Church, but with difficulty, because he had fought a duel. Arbuthnott himself had no love for the Georges, but the son might show his loyalty with advantage, and without compromising the father.

For a considerable period after this event our author gave his name to no productions, but some of his biographers say, on no very definite evidence, that for three or four years he was busily engaged in the composition of various political pamphlets. It is more evident, however, that at this time he was in very indifferent health; for in a letter to Swift, dated June 9th, 1729, he says that "he is bad of a constant convulsion in his heart, so that he is likely to expire sometimes." A squib, called *A Brief Account of Mr. John Ginglicutt's Treatise concerning the Altercation or Scolding of the Ancients*, published in 1731, is attributed to him. It is doubtful whether he wrote it; but whether he did or did not is of no moment, for it has little brilliancy or point, and its meaning is dead. The *Art of Political Lying*, also brought out in this year (1731), is a more pointed satire, and in all probability did come from his hand. I pass it over, however, with the mere mention of it, to refer at

greater length to an essay on aliments, entitled, *An Essay concerning the Nature of Aliments and the Choice of them, according to the Different Constitutions of Human Bodies, in which the Different Effects, Advantages, and Disadvantages of Animal and Vegetable Diet are Explained.* By John Arbuthnott, M.D. London: 1731.

This composition was done while the writer was still in indifferent health, and, therefore, but ill prepared for the labour. The work went ultimately through many editions, and to the third edition were added *Practical Rules of Diet in the Various Constitutions and Diseases of Human Bodies.* Somewhat inconsistent of Arbuthnott was the long title of this work, since in earlier days he had been first to laugh at long titles.

The reason assigned by the author for writing the book on *Aliments* was, that Dr. Cheyne had, some years before, written an essay on *Health and Long Life*, which had "produced even sects in the dietetic philosophy." Arbuthnott was sometimes appealed to in these "symposiac disputations" amongst his friends; and having remarked that the dietetic part of the medicine depended as much as any of the rest on scientific principles, he was called to make good his assertion. He was from home, "absent from his books at the time he composed this treatise," and he apologises earnestly for its shortcomings. "I can say," he adds, "but little of the merit of the performance, but a great deal of that of the subject; for surely the choice and measure of the materials of which the whole body is composed, and what we take daily by pounds, is at least of as much importance as of what we take seldom, and only by grains and spoonfuls."

Throughout this essay there is a rude physiology, far more advanced here and there than might be supposed possible, erroneous oftentimes of necessity, according to our present standard of knowledge, but even in its ignorance common-sense, and in its experimental part bordering on many great truths. He saw that in serum of blood there was a principle identical to white of egg; but the serum was more saline, and, under distillation, yielded a volatile alkaline salt. In some diseases, as scurvy, an alkaline state of the blood obtains. This alkaline acrimony indicates the use of vinegar and of acid fruits, such as oranges and lemon juice. "Heat, thirst, hot belchings, foulness of the tongue and breath, a bitter and hot taste in the mouth, sickness, loathing, bilious vomiting, stools with a cadaverous smell, pains in the belly with heat, are symptoms of an alkaline state of the humours in the stomach and bowels.

"Such a state disposeth the humours of the body to heat, inflammations, and putrefaction, hinders nutrition, and often causes eruptions on the skin, dark, livid, lead-coloured, and gangrenous, and what is commonly called the hot scurvy."

Now and then, too, he adds a practical fact which will bear reviving. I give one illustration:—"If," he says, "there be a specific in aliment for rheumatism, it is whey. I knew a person, subject to this disease, who could never be cured by any other method but a diet of whey and bread."

The ultimate fact at which he seemed to have arrived in his contemplation of aliments was, "that all the intentions pursued by medicines might be obtained and enforced by diet." These are his own words, as they were his thoughts. Had he lived in these times, he would have seen to the bottom of the homœopathic success without spectacles. It was, indeed, from ignoring such facts as he taught, that Hahnemann succeeded in planting his name and system on mankind. The treatise on aliments was well received, and its author promised to take up the subjects of air, rest, and motion, in the same manner.

A note still remains for the year 1731. There died at this time in Scotland, aged sixty-two, one Colonel Charteres, a man reported as of most execrable character. Upon him an epitaph was written, which is said confidently to be from the pen of Arbuthnott.*

HIS GREATEST WORK.

In 1732, Arbuthnott went to work tooth and nail in endeavouring to reform certain abuses and tricks which were being carried on under the title of *Charitable Corporations*. This effort did not prevent him, though he became the victim of asthma and had been obliged to remove to Hampstead for change of air, from bringing before the public, in accordance with his promise, *An Essay*

* The epitaph opens as follows, and continues in similar strain:—

"Here continueth to rot
 The body of Francis Charteres,
 Who, with an indefatigable constancy and inimitable
 Uniformity of life,
 Persisted,
 In spite of age and infirmities,
 In the practice of every human vice,
 Excepting prodigality and hypocrisy,
 His insatiable avarice exempting him from the first,
 His matchless impudence from the second."

concerning the Effects of Air on Human Bodies. London: 1732.
His greatest work.

It has been surmised that he was led to the study of this work from being himself a sufferer from asthma. This is mere invention, for he gives sufficiently valid reasons for his undertaking. The subject had long been in his thoughts, and there was no one else who chose to consider it. The book was, however, written at a period when the increasing bad health of its master led to frequent interruptions. The preface is loaded with apologies. In it he gives us an insight into the character of his mind, which will have already been detected by the critical reader. "That weariness," he observes, "in thinking about the same subject, incident to me, perhaps, with others of mankind, makes me abandon several particulars too soon."

Arbuthnott, at least, knew his own peculiarities. Brilliancy of thought depends often on shortness of exertion, and the pungency of wit lies in the concentration of the greatest possible amount of mental force into the smallest possible space of time. Your true wit is a thinking rifle. You touch him on the explosive part, and he goes off so sharply, and with such effect, that you start back, and if you yourself are not the target, your wonder, or your admiration, or both, are carried out of bounds, electrically. But here your wit ends his accomplishments. The sharp, telling crack is his distinguishing trait; he must have time to reload.

Arbuthnott, according to all his cotemporaries, was not without the peculiarities of his class. He was a momentary philosopher; so nature formed him. The weariness of a long stretch of thought was more than he could bear.

The essay on the *Effects of Air* is, notwithstanding the peculiarities of the man, one of the most remarkable books in the literature of medicine, and by many odds the best scientific work of Arbuthnott. There is genius in its every page, a true living soul in every paragraph, an inseeing into things to him almost indefinable, and a glance at facts that were to come, which can only be appreciated by those who will take the trouble to read the essay through with care, and with an eye fixed on the knowledge of the present as well as of Arbuthnott's day and generation. There had been no Dutrochet or Graham to tell Arbuthnott the secret of osmosis; no Priestley, Black, Lavoisier, or Liebig to explain to him the nature and meaning of respiration; yet hear how this philosopher could reason on these subjects.—"The blood in the lungs is warmer than on the surface of the skin; the coats of the vessels and the pulmonary

artery are extremely thin, and of those exposed to the outward air; and yet the perspiration from the lungs is not half of that from the skin. What is the reason of this small proportion? Is the air absorbed? For the quantity of perspiration is the difference between the air absorbed and the humour prepared. There are several things which may be said for and against the air's entering the blood-vessels of the lungs in respiration.

"From the flaccid state of the lungs of animals that die *in vacuo*, it seems evident that the lungs do not expand themselves upon the exsuction of the air; consequently, the air is sucked out or escapes through the blood-vessels of the lungs; else, if retained, it would expand and swell them; if the air has a free egress through the coats of the vessels of the lungs, it may have a free ingress. On the other hand, attempts to force air into the blood-vessels of the lungs by the windpipe have proved unsuccessful, and the lungs of animals that die *in vacuo* afterwards swell in the air-pump. Things may happen in a live animal which will not succeed in a dead one. *Air will pass through any membrane when moist.* The quick restoration of the balance of the air within and without human bodies shows that there is a free communication; and it is probable that it is so in the lungs as well as in other parts of the body."

It is unnecessary to indicate how deep a knowledge is here shown of facts which have required the space of a hundred and fifty long years to be brought to a state of demonstration and acknowledgment.

We might rest long in admiration of this wonderful essay, but time presses. One word more. We have seen that Arbuthnott's mind was of the acute, tense, electric order. The fact is admirably shown in the work now being pursued. In one sentence he gives a definition of the physiological use of respiration. The sentence is the man; and if he had lived only to emit this short saying, he would have sworn himself great. "RESPIRATION IS THE SECOND DIGESTION." Think as we will, with Liebig and eremacausis right near, and no profounder definition of the fact can be given. Our ideas about details may change, and Liebig's definition of eremacausis may even be forgotten; but this immense generalisation, embraced in five words, is an indelible utterance.

MISCELLANEOUS WORKS.

In so far as I have traced out the career of Arbuthnott, I have referred to such only of his literary works as are known positively to have been written by him. There are, however, various tracts and

small essays rusting in old libraries, and bearing no author's name, which have been fathered on him without much regard to historical accuracy. At one time De Foe's immortal *Robinson Crusoe* was believed to have been written by Arbuthnott—an entire fallacy long since exploded. Of political productions classed as his works, some bear internal evidence of having come from a source quite different, and from minds of a stamp much inferior to his. *Harmony in an Uproar*; *The Congress of Bees*; *The Art of Selling Bargains*; *The Longitude Examined for Longitudinarians*; *The Petitions of the Cooks and Colliers*; *The Life and Adventures of Don Bilioso de l'Estomac*; *The Most Wonderful Wonder*; *The Manifesto of Lord Peter*; *The Devil to Pay at St. James's*; *The Masquerade*, a poem (the author of which was certainly no poet); *The State Quack*; *Gulliver Deciphered* (an indirect puff in favour of Arbuthnott); *A Learned Dissertation on a Dumpling*—all this trash of trash I believe to consist of works in which Arbuthnott had no part whatever.

Some other miscellaneous works attributed to Arbuthnott, though anonymously published, may, from their style and argument, be fairly considered as his. *The History of John Bull* is one of these—a very able satire, and amusingly readable even now, although the social changes that have intervened since its day have taken off its point. In like manner I may speak of the pamphlets: *It Never Rains but it Pours*; *The Political Art of Lying*; *The Supplement of Swift's Miscellanea*; *A Letter to the Students of both Universities*; *An Essay on an Apothecary*—a very bitter satire; *An Account of a Surprising Apparition on October 24th, 1732*; *A Sermon Preached at the Market Cross, Edinburgh, on the Subject of the Union, in 1706, from the Text, "Better is he that laboureth and aboundeth in all things, than he that boasteth himself and wanteth bread"*—a shrewd and able discourse; *An Account of the State of Learning in the Empire of Lilliput, together with the History and Character of Bellum, the Emperor's Librarian*—an amusing tale in the *Gulliver* style; *Critical Remarks on Gulliver's Travels*—a facetious attempt to prove by classical authorities that the notion of the Houyhnhnms was well known to the ancients of Greece, Italy, and England; and a poem, or reputed translation called *Know Thyself*, serious in tone but barren in poetry. *The Hazards of Game* (8vo, London, 1692) and *The Freeholder's Political Catechism* (a political satire) are attributed, the first safely, the second doubtfully, to Arbuthnott. The

catechism, which seems to have appeared in 1733, was not fathered on him until after his death.

I cannot pass over in silence two other snatches which have been laid at the door of Arbuthnott, with insufficient evidence, it is true, yet not without plausibility. It will be remembered that, in his first days in London, he opened a discussion on Dr. Woodward's work on geology. In 1728 Woodward died. Soon after this event there appeared *An Account of the Sickness and Death of Dr. W—dw—d, and also what Appeared on the Opening of his Body, by Dr. Technicum*. I hope and believe the critics are wrong who say that Arbuthnott wrote this low and contemptible satire, the only passable point of which, even satirically, is, that Woodward administered, in the course of his life 20,473 vomits, 756 hogsheads 4 gallons and a pint of sack whey, and above 50 tons of oil.

In like manner, I hope that the critics are again wrong in supposing that another tract (*The Memorandums of the Six Days preceding the Death of a Late Right Reverend*), and dated March 18th, 1714, came from the hand of our witty physician. Assuredly, there is no wit or worth in this scribble; and it is impossible to affix to it the name of its true author.

From Pope's own showing, in a letter to Warburton dated November 27th, 1742, it is clear that some of the notes to the first editions of the *Dunciad* were by Arbuthnott, who, indeed, furnished the susceptible poet with many witty points and satires, which were easily interwoven into his melodious verse.

TOWARDS THE END.

Returning to the chronological order of our narrative, we enter the year 1734. Arbuthnott was failing fast. He had sped through sixty-seven summers, and his work was well nigh done. He lived chiefly at Hampstead at this time. Before the last scene his more vigorous friend Pope crowned him with a final garland. The immortal prologue to the *Satires* was done in the form of an epistle to the *Friend of my Life*. Dipped in gall was the pen of the poet; but in the midst of bitterness, and with his teeth keenly on edge against half mankind, he concentrated in the last lines the whole of his living and loving sympathies on his dear Æsculapian.

“ Oh, friend, may each domestic bliss be thine ;
Be no unpleasant melancholy mine.
Me let the tender office long engage
To rock the cradle of reposing age,

*With lenient arts extend a mother's breath,
 Make languor smile, and smooth the bed of death,
 Explore the thought, explain the asking eye,
 And keep a while one parent from the sky.
 On cares like these if length of days attend,
 May Heaven, to bless those days, preserve my friend !
 Preserve him social, cheerful, and serene,
 And just as rich as when he served a queen."*

The poet's hope was unrealised. Arbuthnott wrote this year his often-quoted farewell letter to Pope. There is something enchanting in this last contribution to letters, which marks the man, and tells his life-story in a few lines. He has, he says, the satisfaction to find that he is as officiously served by his friends as he that has thousands to leave in legacies, besides the assurance of their sincerity. His bodily distress is as easy as a thing of that kind can be. He has found relief sometimes from the air of Hampstead. His nights are bad, but many have worse. He then refers to his love for Pope, whose talents were not the foundation of his friendship. He urges the poet to continue that noble disdain and abhorrence of vice which he seems naturally endued with, and to study more to reform than to chastise. Lord Bathurst he compliments; the venison present will be acceptable to friends, but the writer's venison stomach is gone. His recovery he feels hopeless; the kindest wish of his friends for him must be "Euthanasia," a happy death. Living or dying, he is the poet's friend.

Such is an outline of this famous letter; it was written from Hampstead on July 17th, 1734, and was replied to by Pope in happy strain: "You are fitter to live or to die than any man I know." Envious Arbuthnott!

Before the year closed, a severe shock was given to Arbuthnott by the death of his son Charles. Writing to Swift from Hampstead, on October 4th, 1734, he foresees very plainly that his own end is near, and at the same time shows that, whatever his practice had been, he had laid by but little fortune. "I am not in circumstances," he relates, "to live an idle country life. I am in the case of a man that was almost in harbour and then blown back to sea, who has a reasonable hope of going to a good place, and an absolute certainty of leaving a very bad one. Not that I have any particular disgust of the world; for I have as great comfort in my own family, and from the kindness of my friends, as any man; but the world, in the main, displeaseth me, and I have too true a presentiment of calamities that

are like to befall my country." It is to him, at the same time, "a most sensible affliction to bring his children to bear the loss of a father who loves them and whom they love."

In the close of the year Arbuthnott returned to London, not to Dover Street—for he had left there—but to Cork Street, Burlington Gardens. Here he lived on until February 27th, 1735, when he met the "Euthanasia" and slept the sleep. Swift might never have seen his friend again though he had lived, yet it were a satisfaction even to know that he was alive.

When Mrs. Arbuthnott died, I am not able to say; but at the time of Arbuthnott's death there were left two children: one son, George, and one daughter, Anne. George became first secretary in the Remembrancer's Office in the Exchequer under Lord Masham. He prospered in the world, and was made one of the executors of Pope, with a legacy from the poet of £200. He died aged seventy-six, in 1779. Anne Arbuthnott, who possessed much of her father's taste and wit, was also remembered by Pope in a legacy of £200.

The political opinions of Arbuthnott are sufficiently well known. He clung to the Stuart family and the Tory party, but was too candid not to admit such virtues as did exist in the first representative of the House of Brunswick.

Of his professional bias we know little, except that he had no great reverence for either the surgeons or apothecaries of his day, and placed more faith in general treatment than in the specific application of particular remedies. He sometimes prescribed for Swift by letter. Cinnabar of antimony and castor form parts of one of these prescriptions (Dec. 11th, 1718); but he had not much faith in the "cinnabar." Another time he advises "Geronster waters, which will not carry from the spot," for vertigo (Nov. 17th, 1723). In a third note Peruvian bark and iron rust are the remedies (Nov. 1730).

By the kindness of the President, Treasurer, and Registrar of the Royal College of Physicians, I supply an autotype of an oil portrait of Arbuthnott, belonging to the College, which portrait, according to the learned Librarian, Dr. Munk, is "presumed to be by Jervas. It was formerly in the possession of Dr. Turton, Bishop of Ely," at the sale of whose effects it was purchased by the College in 1864. The portrait, not a very powerful work of art, though good in details, presents to us the genial rather than the brilliant character of its original.

As an historical character, Arbuthnott is a man who, while he

made himself, helped others ; who was broad and far-seeing in philosophy ; who practised his profession as a science, and ignored it as a trade ; who, living in the company of men to whom English literature and poetry are ever indebted, infused into the minds of these much of that brilliancy, point, and wit, for which their books are so remarkable ; who in prose-writing excelled pre-eminently, and who had sense enough to give up the poet's vocation when he found such vocation not to be his own ; who was esteemed by his comrades as "having more wit than all of them, and more humanity than wit" ; who abhorred vice, and, for her own sake, loved virtue. On these claims, considered in their combined rather than in their individual importance, the fame of Arbuthnott rests ; on them is based the right to number him amongst the great men of the Æsculapian line.

John Snow, M.D., a Representative of Medical Science and Art of the Victorian Era

THE Victorian Faculty of Physic has produced no one man of commanding genius who has remained in medicine, practising the art. It has, however, produced many truly representative men who, in their combined labours, offer a magnificent result of work done and advancement made. Amongst these I should place in the first rank the late Dr. John Snow, and for this reason I bring forward here a sketch of his career for the student of the future.

John Snow was born at York, on June 15th, 1813. He was the eldest son of his parents. His father was a farmer. As a child he showed his love of industry, and increasing years added only to the intensity with which he applied himself to any work that was before him. He was first sent to a private school at York, where he learned all that he could learn there. He was fond of the study of mathematics, and in arithmetic became very proficient. At the age of fourteen he went to Newcastle-on-Tyne, as an articled pupil to Mr. William Hardcastle, surgeon, of that place. He had also the opportunities of studying at the Newcastle Infirmary. During the third year of his apprenticeship, when he was seventeen years old, he formed an idea that the vegetarian system of feeding was the true and the old; and with a consistency which throughout life attended him, tried the system rigidly for more than eight years. He was a noted swimmer at this time, and could make head against the tide longer than any of his omnivorous friends.

At or about the same time that he adopted his vegetarian views he also took up the temperance cause. He not only joined the ranks of the total abstinence reformers, but became a powerful advocate of their principles for many succeeding years. In the latter part of his

life he occasionally drank a little wine, but his views on the subject remained to the end unchanged. He retained a strong faith in total abstinence, and a belief that it must ultimately become universal.

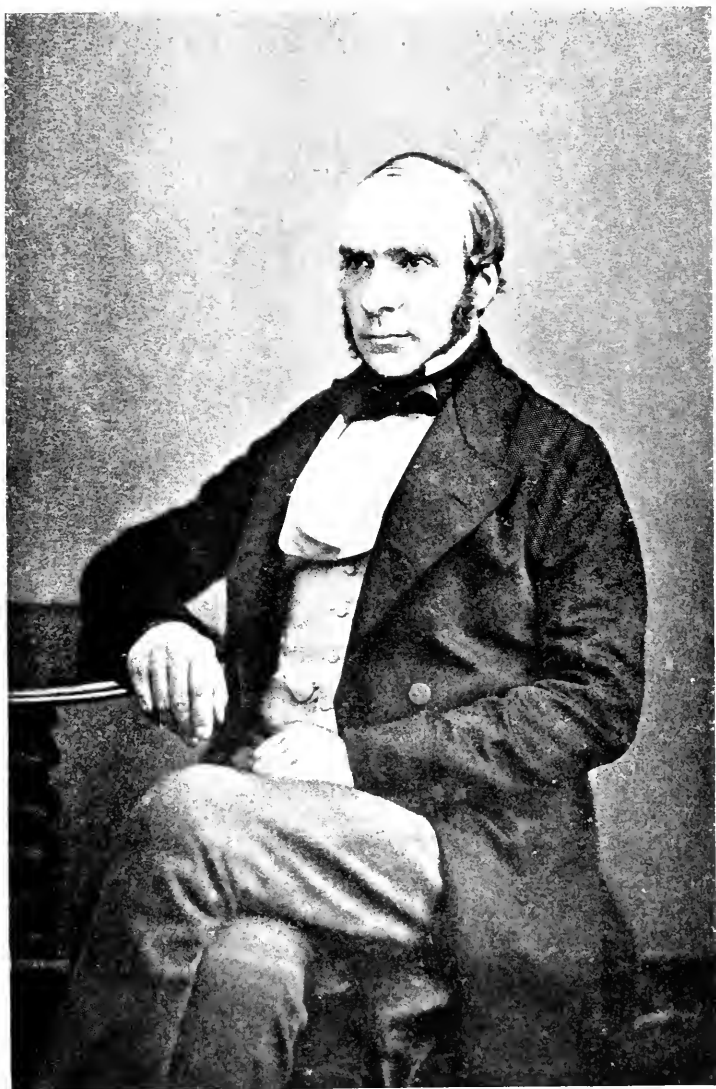
In 1831-32 cholera visited Newcastle and its neighbourhood, and proved terribly fatal. In the emergency Mr. Snow was sent by Mr. Hardcastle to the Killingworth Colliery, to attend the many sufferers from the disease. In this labour he was indefatigable, and his exertions were crowned with great success. He made also various observations relating to this disease, which proved to him of immense account in after-years.

He left Newcastle in 1833, and engaged himself as assistant to Mr. Watson, of Burnop Field, near Newcastle, with whom he resided for twelve months. Leaving Burnop Field in 1834-5, he revisited his native place, York, for a short stay, and thence to a certain half-inaccessible village called Pately Bridge, in Yorkshire, to act as assistant to Mr. Warburton, surgeon of that place. Eighteen months at Pately Bridge, with many rough rides, a fair share of night work, a good gleanings of experience, and, this sojourn over, our student went back again to York, to remain a few months, and to take an active share in the formation of temperance societies. In leisure days during this period it was his grand amusement to make long walking explorations into the country, collecting all kinds of information—geological, social, sanitary, and architectural.

At last York must again be left, for the London student life was in view. In the summer of 1836 he set off from York to Liverpool, and, trudging it afoot from Liverpool through the whole of North and South Wales, turned London-ward, calling at Bath by the way, on a visit to his uncle, Mr. Empson, to whom, to the end of his life, he was devotedly attached. October, 1836—eventful October—brought him to the “great city,” and placed him on the benches of the Hunterian School of Medicine in Windmill Street: a school long since closed, and now as mythical as the mill which gave the name to the locality.

In October, 1837, Mr. Snow began to take out his hospital practice at the Westminster Hospital. On May 2nd, 1838, he passed his examination, and was entered duly as a member of the Royal College of Surgeons of England. In October, 1838, he passed the Apothecaries’ Hall, and was now duly qualified in medicine. His student days were passed at 11, Bateman’s Buildings, Soho Square.

At this time there existed in London a society (now the Medical



JOHN SNOW, M.D.



Society of London), called the Westminster Medical Society. It was a society which had long given encouragement to those junior members of the medical profession who might wish for a hearing at its meetings and debates. Mr. Snow was not the man to lose an opportunity such as this. I have often heard him say, both privately and publicly, that, upon his early connection with the Westminster Medical, his continuance in London depended; and all his succeeding scientific success. When he first attended the meetings of the Westminster Medical, he was very timid; and although he always spoke to the point, he found it difficult to obtain a favourable notice. At first nobody ever replied to what he said. After a long time some grave counsellor condescended to refer to him as the "last speaker." A little later and somebody ventured to name "the last speaker" by his name. Then some one, bolder still, concurred with Mr. Snow; and ultimately Mr. Snow became recognised more and more, until the presidential honours were his own.

Frith Street, Soho-square, No. 54, was the house at which Mr. Snow, to use his own words, "first nailed up his colours." He removed there from Bateman's Buildings in September, 1838. He bought no practice, nor exhibited any pretence, but a more thoroughly girded man for the world's encounter could hardly be conceived than he at this time. He took no wine nor strong drink; he lived on anchorite's fare, clothed plainly, kept no company, and found every amusement in his science books, his experiments, and simple exercise.

To fill up time till the money patients should come, he became one of the visitors of the out-patients of Charing Cross Hospital, and to many a representative of the great poor he extended a skill which would have been a blessing to the great rich. The librarian of the College of Surgeons' Library considered him a quiet man, who read closely, and was not too proud to ask for a translation when an original bothered him. All who knew him said he was a quiet man, very reserved, a clever man, but not easy to be understood, and very peculiar.

The connection with the Westminster Medical led to Mr. Snow's first attempts at authorship. On October 16th, 1841, he read at the Society a paper on *Asphyxia and on the Resuscitation of New-born Children*. The paper in full will be found in the *London Medical Gazette* for November 5th of the same year. The paper is remarkable for the soundness of its reasonings and the advanced knowledge which it displays. The object of the paper was

to introduce to the Society a double air-pump, for supporting artificial respiration, invented by Mr. Read of Regent Circus. The instrument was so devised that by one action of the piston the air in the lungs could be drawn into one of the cylinders, while by the reverse action the expired air could be driven away, and the lungs supplied with a stream of pure air from the second cylinder. There was also advanced, in the concluding part of the communication, the view that the cause of the first inspiration is probably the same as the second or the last—viz., a sensation or impression arising from a want of oxygen in the system. So long as the placenta performs its functions, the fœtus is perfectly at ease, and feels no need of respiration; but whenever this communication between the child and its mother is interrupted, at least in the later months of pregnancy, the child makes convulsive efforts at respiration similar to those made by a drowning animal.

On December 18th, 1841, Mr. Snow was again before the "Westminster Medical" with a very ingenious instrument which he had invented for performing the operation of paracentesis of the thorax. The description of the instrument will be found in the *Medical Gazette* of January 28th, 1842.

In the *Medical Gazette* for November 11th, 1842, Mr. Snow published a note on a new mode for securing the removal of the placenta in cases of retention with hæmorrhage; and in the same journal for March 3rd, 1843, he communicated an essay on the circulation in the capillary vessels. The essay was selected and rearranged from papers read before the "Westminster Medical" on January 21st and February 4th. We have in this essay an admirable sketch of the capillary circulation. He advanced, on this occasion, the idea that the force of the heart is not alone sufficient to carry on the circulation, but that there is a force generated in the capillary system which assists the motion. He explained also the great importance of the cutaneous exhalation, and reasoned that in febrile states, accompanied with hot skin, the transpiration from the skin is in reality greater than it is in health.

Pushing on in the higher branches of his profession, and aiming always at the best, the degree of the University of London became a temptation, and *Mr.* became *Dr.* Snow on the 23rd of November, 1843, by passing the M.B. examination. He was enrolled in the second division on this occasion. On the 20th of December in the following year he passed the M.D. examination, and came out in the first division.

The harass of London life by this time commenced to tell on Dr. Snow. He had suffered a few years previously from threatened symptoms of *Phthisis pulmonalis*, but took plenty of fresh air and recovered. He again became unhinged for work, and in the summer of 1845 was attacked with acute and alarming symptoms of renal disorder. His friend and neighbour, Mr. Peter Marshall, then of Greek Street, afterwards of Bedford Square, gave him his able assistance, and the advice of Dr. Prout and of Dr. Bright was obtained. In the autumn of 1845 he paid a visit to his old colleague, Mr. Joshua Parsons, at Beckington. From Beckington he went to the Isle of Wight, but soon returned to London and was elected Lecturer on Forensic Medicine at the Aldersgate School of Medicine, an appointment held till the school ceased in 1849.

There is no night without its morning. The eventful medical year of 1846 proved the turn of tide season for our struggling Æsculapian. In this year the news came over from America that operations could be painlessly performed under the influence of ether.

The fact was just such an one as would at once attract the earnest attention of Dr. Snow. It was a physiological, as well as a practical fact. It was rational in its meaning, and marvellously humane in its application. The question, once before him, was in a scientific sense his own. His previous experimental studies on respiration and asphyxia had prepared him for this new inquiry; he took it up for its own sake and not from any thought, at the time, of a harvest of gold.

The first inhalations of ether in this country were not so successful as to astonish all the surgeons, or to recommend etherisation as a common practice. The distrust arose from the manner in which the agent was administered. Dr. Snow at once detected this circumstance; and remedied the mistake by making an improved inhaler. He next carried out many experiments on animals and on himself, and brought the administration to great perfection. One day, on coming out of one of the hospitals—I am giving the narrative as he gave it to me—he met a druggist whom he knew bustling along with a large ether apparatus under his arm. "Good morning!" said Dr. Snow. "Good morning to you, doctor!" said the friend; "but don't detain me—I am giving ether here and there and everywhere, and am getting quite into an ether practice. Good morning, doctor!" "Rather peculiar!" said the doctor to himself; "rather peculiar, certainly! for this man has not the remotest

physiological idea. An 'ether practice !' If he can get an ether practice, perchance some scraps of the same thing might fall to a scientific unfortunate." Consequently, with his improved inhaler, Dr. Snow lost no time in asking to be allowed to administer ether to the out-patients at St. George's Hospital, in cases of tooth-drawing. Dr. Fuller, of Manchester Square, standing by, was surprised to see with what happy effects ether was administered when administered properly. A day or two afterwards, a major operation having to be performed, and the surgeon, Mr. Cutler, not approving of the ether in the way in which it had previously acted, Dr. Fuller remarked on the superiority of Dr. Snow's mode of administering it ; and the result was, that he was asked to give it on operating days. He did so with great success. He administered it also at University College with the same success. Liston, then the leading operator, struck with the new man, able as unaffected, took him by the hand ; and from that time the ether practice in London came almost exclusively to Dr. Snow.

The new field once open, it were impossible but that he should cultivate it diligently. The Westminster Medical Society was often favoured with his communications and experiments on etherisation ; and in the September of 1847 he embodied, in his first work, the whole of his experience up to that time. The work was remarkable for the care with which it was written, and the complete mastery of the subject which it conveyed.

What had been a mere accidental discovery, I had almost said a lucky adventure, was turned by the touch of the master into a veritable science. The book was beginning to be appreciated when the discovery of the application of chloroform threw ether into the shade, and the book with it.

Dr. Snow, though a man of great firmness when once his mind was made up, was always ready for new inquiry. Chloroform, therefore, was no sooner brought before the profession by Dr. Simpson, than he began to institute a series of independent researches, and having satisfied himself personally as to the effects and greater practicability of chloroform, he at once commenced its use, and forgot sooner than most others his predilections for ether. In 1848 he commenced a series of experimental papers on narcotic vapours in the *Medical Gazette*, and continued them until 1851, when the *Medical Gazette* ceased to exist independently. The papers on narcotics, in accordance with his other and earlier productions, were stamped with the evidences of profound and careful

research, and still more careful deduction. I infer that they have been more talked about than read, for few people seem to be aware of the enlarged and original physiological arguments which they contain. Chloroform and ether are not alone discussed, but all narcotics. Narcotics are not alone considered, but various of the great functions of life. The records of a vast number and variety of experiments are here related, and an amount of information, original in kind, collected, which will always remain as a memorable record in the history of medical literature. But the great points in these papers are those in which the author enters on the physiological action of narcotics. Here appear the generalisations and insights into the relations of allied phenomena which mark the man of true power.

The year of the world's fair in London, 1851, may be considered a fortunate one for Dr. Snow. His affairs had taken a new turn, and the tide was fairly in his favour. He had a positive holiday, physical and mental. The harass of the professional struggle was over, the world was opening its eyes to his intrinsic merits; old friends, brought to the grand show in town, flocked around him, and all was well. He did but little that was new this year, except to write a characteristic letter to Lord Campbell, who was pushing on a Bill in the House of Lords, called the *Prevention of Offences Bill*, in which a clause was introduced to prevent, by severe punishment, any attempt that might be made by any person to administer chloroform or other stupefying drug for unlawful purposes. Dr. Snow, believing that Lord Campbell was actuated in introducing this clause by the fact of certain trials having recently occurred for the offence of using chloroform unlawfully, and being himself convinced that, in two of the cases, one the case of a robbery in Thrale Street, the other of a robbery attempted on London Bridge, the evidence against the prisoners, of attempting to produce insensibility by chloroform, was without any reason or possibility, he opposed the aforementioned clause in the Bill, on the ground that, if it became law, numerous frivolous and false charges would be constantly brought up against innocent people, or against guilty persons, but persons not guilty of the special charge laid against them, that, namely, of administering a volatile narcotic by inhalation. Knowing that weakness of human nature which leads a man, in the presence of all evidence, never to admit intoxication as possible in his own proper person, Dr. Snow felt that, in any case where an intoxicated person had been robbed, such person might allege that he had been made insensible by narcotic vapour. The two cases specially noticed in

his letter admitted readily of such interpretation, and were clearly not cases in which chloroform had been administered. Lord Campbell, on the receipt of Dr. Snow's letter, referred to it in very complimentary terms in the Lords, but intimated that the reasoning of the letter did not alter his determination.

In the year 1848 Dr. Snow, in the midst of his other occupations, turned his thoughts to the questions of the cause and propagation of cholera. He argued in his own mind that the poison of cholera must be a poison acting on the alimentary canal by being brought into direct contact with the alimentary mucous surface, and not by the inhalation of any effluvium. In all known diseases, so he reasoned, in which the blood is poisoned in the first instance, there are developed certain general symptoms, such as rigors, headache, and quickened pulse; and these symptoms all precede any local demonstration of disease. But in cholera this rule is broken: the symptoms are primarily seated in the alimentary canal, and all the after-symptoms of a general kind are the results of the flux from the canal. His inference from this was, that the poison of cholera is taken direct into the canal by the mouth. This view led him to consider the media through which the poison is conveyed, and the nature of the poison itself. Several circumstances lent their aid in referring him to water as the chief, though not the only, medium, and to the excreted matters from the patient already stricken with cholera, as the poison. He first broached these ideas to Drs. Garrod and Parkes, early in 1848; but feeling that his data were not sufficiently clear, he waited for several months, and having in 1849 obtained more reliable data, he published his views *in extenso* in a pamphlet, entitled *The Mode of Communication of Cholera*. During subsequent years, but specially during the great epidemic outbreak of the disease in London in 1854, intent to follow out his grand idea, he went systematically to his work. He laboured personally with untiring zeal. No one but those who knew him intimately can conceive how he laboured, at what cost, and at what risk. Wherever cholera was visitant, there was he in the midst. For the time he laid aside as much as possible the emoluments of practice; and when, even by early rising and late taking rest, he found that all that might be learned was not, from the physical labour implied, within the grasp of one man, he paid for qualified labour. The result of his endeavours, in so far as scientific satisfaction is a realisation, was truly realised, in the discovery of the statistical fact, that of 286 fatal attacks of cholera, in 1854, occurring

in the south districts of the Metropolis, where one water company, the Southwark and Vauxhall, supplied water charged with the London fæcal impurities, and another company, the Lambeth, supplied a pure water, the proportion of fatal cases to each 10,000 houses was to the Southwark and Vauxhall Company's water 71, to the Lambeth 5.

There was, however, another fact during this epidemic, which more than the rest drew attention to Dr. Snow's labours and deductions. In the latter part of August, 1854, a terrific outbreak of cholera commenced in and about the neighbourhood of Broad Street, Golden Square. Within two hundred and fifty yards of the spot where Cambridge Street joins Broad Street, there were upwards of five hundred fatal attacks of cholera in ten days. To investigate this fearful epidemic was at once the self-imposed task of Dr. Snow. On the evening of Thursday, September 7th, the vestrymen of St. James's were sitting in solemn consultation on the causes of the visitation. They might well be solemn, for such a panic possibly never existed in London since the days of the great plague. People fled from their homes as from instant death, leaving behind them, in their haste, all which before they valued most. While, then, the vestrymen were in solemn deliberation, they were called to consider a new suggestion. A stranger had asked, in modest speech, for a brief hearing. Dr. Snow, the stranger in question, was admitted, and in few words explained his view of the "head and front of the offending." He had fixed his attention on the Broad Street pump as the source and centre of the calamity. He advised the removal of the pump-handle as the grand prescription. The vestry was incredulous, but had the good sense to carry out the advice. The pump-handle was removed, and the plague was stayed. It was my privilege, during the life of Dr. Snow, to stand on his side. It is now my duty, as a biographer who feels that his work will not be lost, to claim for him not only the entire originality of the theory of the communication of cholera by the direct introduction of the excreted cholera poison into the alimentary system; but, independently of that theory, the entire originality of the discovery of a connection between impure water supply and choleraic disease. The whole of his inquiries in regard to cholera were published in 1855, in the second edition of his work on the *Mode of Communication of Cholera*—a work in the preparation and publication of which he spent more than £200 in hard cash, and realised in return scarcely so many shillings.

In 1856 he made a visit to Paris in company with his uncle, Mr. Empson, who having personally known the emperor many years, had on this occasion special imperial favours shown to him, in which the nephew participated. During the visit Dr. Snow lodged a copy of his work on Cholera at the Institute, in competition for the prize of £1200 offered for the discovery of a means for preventing or curing the disease. The decision of the judges has since been published, but with no notice of Dr. Snow's researches.

The Medical Society of London, reformed under that name in 1849-50, by amalgamation with the Westminster Medical, was at this time the principal scene of Dr. Snow's scientific exertions. In 1852, the Society elected him as Orator for the ensuing year; and at the eightieth anniversary of the Society, held on March 8th, at the Thatched House Tavern, he delivered an admirable oration on *Continuous Molecular Changes, more particularly in their Relation to Epidemic Diseases*. He made no claim to the orator's gown; but the address was too forcible not to call forth the enthusiasm of the audience. He spent nearly twelve months in the preparation of this oration, in which he endeavoured to convey, in the most pleasing manner at his command, a broad view of his observations on the communication of certain spreading diseases. He advanced, on this occasion, the idea that the poison of intermittent fever, and perhaps yellow fever, is carried direct, like the poison of cholera, into the alimentary system.

Two years after this event, having, meantime, passed the office of vice-president, the Society elected him to the highest honour it can confer—to the presidential chair. He took his place as President, in his unassuming manner, on March 10th, 1855, delivering a short address. Throughout the year he carried out the duties of his office with great success. One of his presidential acts was peculiarly graceful. One evening, while presiding, Dr. Clutterbuck—then the father, or oldest member of the Society—came into the meeting. The venerable and distinguished old man, then long past his eightieth year, had lately been a stranger to the assembly, and was known but to few of the members. The President, as Dr. Clutterbuck entered the room, rose, and in a way that was irresistible in its simple courtesy resigned his chair to the veteran Æsculapian. "It is near fifty years," said Dr. Clutterbuck with emotion, as he took the proffered seat, "since I last occupied this honourable position." At the next anniversary meeting, held on March 8th, 1856, Dr. Clutterbuck came to his last meeting, and to see his friend the President play also his

last part in presidential duties. At the anniversary dinner on that same day, the President reviewed, in feeling terms, his own career in the professional strife, and expressed that his success in life had originated in his acquaintance with the Society.

In addition to the fellowship of the Medical Society, Dr. Snow belonged to the Royal Medical and Chirurgical, Pathological, and Epidemiological Societies, and to the British Medical Association. The Medical Society, from its old associations, was, however, that in which he took the most active part. Next to this, the Epidemiological Society, founded by the late Mr. Tucker, of Berners Street claimed his regard.

The position which he took as an epidemiologist was original, and in opposition to the views of many eminent men who had, in matters relating to public health, considerable scientific and political influence.

He contended, in regard to true epidemic disorders, distinguished by specific symptoms, that they are due to a specific poison, which is propagated by certain fixed laws; which attains its progression and increase in and through animal bodies; which is communicated from one animal body to another; and which is the same in its essence from first to last. This was his position, and he adhered to it. No mere emanation arising from evolution of foul-smelling gases can, *per se*, according to his views, originate a specific disease, such as small-pox or scarlet fever: as well expect that the evolution of such gases should plant a plain with oaks or a garden with crocuses. The small-pox may occur over a cesspool, as an oak may spring up through a manure heap; but the small-pox would never appear over the cesspool in the absence of its specific poison; nor the oak rise from the manure heap in the absence of the acorn which seeded it.

In 1855 Dr. Snow gave evidence before the select committee on the *Public Health and Nuisances Removal Bill*, in which evidence he strove to convey the impressions condensed above. Feeling that he had not been correctly understood, he afterwards wrote a letter to Sir Benjamin Hall, in which he set forth the whole of his argument very distinctly and sensibly. He indicated in this letter that he was no defender of nuisances, but that whereas a bad smell cannot, simply because it is a bad smell, give rise to specific disease, so an offensive business conducted in a place where it ought not to be, should be proceeded against by ordinary law as a nuisance, without applying to it the word pestiferous, or otherwise dragging in and distorting the science of medicine.

In relation to public health Dr. Snow contributed many other observations. In the first number of my *Journal of Public Health and Sanitary Review*, he communicated a valuable paper, previously read at the Epidemiological Society, on the *Comparative Mortality of Town and Rural Districts*; and, previous to his decease, he was busily occupied in investigating the question of adulteration of bread with alum. He made several analyses of different specimens of bread, but his papers merely leave a brief record of the fact, without any comments or results.

I return for a few moments to some further points connected with his researches on inhalation. In addition to his experiments with volatile narcotics, he carried out for a long time a series of inquiries with other medicinal substances, and administered many remedies by inhalation at the Brompton Hospital, during a period of twenty months. In 1851 he recorded the result of this experience at the Medical Society of London, and explained the modes of administering various agents. Some, as morphia and stramonium, were inhaled with the aid of heat; others, as hydrocyanic acid and conia, were inhaled at the ordinary temperature. The particulars of these experiments will be found in a short paper in the *London Journal of Medicine* for January, 1851.

He continued steadily to investigate the effects of various volatile agents for the production of insensibility, performing a variety of experiments with carbonic acid, carbonic oxide, cyanogen, hydrocyanic acid, Dutch liquid, ammonia, nitrogen, amylovinic ether, puff-ball smoke, allyle, cyanide of ethyle chloride of amyl, a carbo-hydrogen from Rangoon tar, a carbo-hydrogen coming over with amylene, and various combinations of these. His grand search was for a narcotic vapour which, having the physical properties and practicability of chloroform, should, in its physiological effects, resemble ether in not producing paralysis of the heart.

First he ascertained the boiling-point of the substance under investigation; then the point of saturation of air with the vapour at different temperatures; next the effects of inhalation of the vapour by inferior animals; and finally the quantity required to be inspired, with the air breathed, to produce insensibility. When he had obtained any substance which would produce insensibility favourably on animals, he pushed it, in one or two experiments, to its extreme in animals of different kinds. Then, having produced death by the inhalation, both by giving rapidly a large dose, and by giving a small dose for a long period, he observed the mode of death, whether it

occurred primarily by cessation of the heart, or by cessation of the respiration. If the agent seemed to promise favourably from these inquiries, he commenced to try it on man; and the first man was invariably his own self. His friends, knowing his unflinching courage in the ardour of his inquiries, often expostulated with him in regard to the risks he ran. It was of no avail. He felt the personal trial a duty, and he did it. I do not believe, as some have supposed, that these personal experiments had any effect in producing his early death; but it is certain that he underwent many risks in the performance of his investigations, and that he held his own life of least value when the lives of others were under consideration.

There is yet another trait in his character which I cannot but notice, and which I would respectfully commend to all physiological inquirers. While he held it as a necessity to use inferior animals for the purpose of experiment, he never touched living thing with the physiologist's finger without having before him some definite object; and never performed experiment on any animal without providing with scrupulous care against the infliction of all unnecessary suffering. The interests of humanity were, he thought, best advanced by the universal practice of humanity.

By his earnest labours Dr. Snow soon acquired a professional reputation, in relation to his knowledge of the action of anæsthetics, which spread far and wide; and the people, through the profession, looked up to him from all ranks, as the guide to whom to entrust themselves in "Lethe's walk." On April 7th, 1853, he administered chloroform to Her Majesty at the birth of Prince Leopold. A note in his diary records the event. The inhalation lasted fifty-three minutes. The chloroform was given on a handkerchief, in fifteen minim doses; and the Queen expressed herself as greatly relieved by the administration. He had previously been consulted on the occasion of the birth of Prince Arthur, in 1850, but had not been called in to render his services. Previous to the birth of Prince Leopold he had been honoured with an interview with His Royal Highness Prince Albert, and returned much pleased with the Prince's kindness and great intelligence on the scientific points which had formed the subject of their conversation. On April 14th, 1857, another note in the diary records the fact of the second administration of chloroform to Her Majesty, at the birth of Princess Beatrice. The chloroform again exerted its beneficent influence, and the Queen once more expressed her satisfaction.

Inquisitive folk often overburdened Snow, after these events, with

a multitude of questions of an unmeaning kind. He answered them all with good-natured reserve. "Her Majesty is a model patient," was his usual reply: a reply which, he once told me, seemed to answer every purpose, and was very true. One lady of an inquiring mind, to whom he was administering chloroform, got very loquacious during the period of excitement, and declared she would inhale no more of the vapour unless she were told what the Queen said, word for word, when she was taking it. "Her Majesty," replied the dry doctor, "asked no questions until she had breathed very much longer than you have; and if you will only go on in loyal imitation, I will tell you everything." The patient could not but follow the example held out to her. In a few seconds she forgot all about Queen, Lords, and Commons; and when the time came for a renewal of hostilities, found that her clever witness had gone home, leaving her with the thirst for knowledge still on her tongue.

From the literary and medical history of Dr. Snow, let me turn for a few pages to his history personal as I knew him. He was of middle height, of somewhat slender build, and of sedate expression. His long life in comparative student loneliness had made him reserved in manner to strangers; but with private friends he was always open, and of sweet companionship. With his increased popularity he became less reserved to strangers, and in the last years of his life he so far threw off restraint as to visit the opera occasionally. But he moderated every enjoyment, and let nothing personal stand in the way of his scientific pursuits. He was the impersonation of order. He had his time and place for everything. He kept a diary, in which he recorded the particulars of every case in which he administered chloroform or other anæsthetic, with comments on the results of the administration, and hints as to dangers avoided or chanced. He kept a record of all his experiments and short notes of observations made by his friends. He rose early, and retired early to rest—at eleven o'clock. He seemed, whenever he was waited on, as though he had nothing in hand, and was always open to an engagement.

Anything and everything of scientific interest that arrested his attention aroused his enthusiasm and his desire to be of use. When I was living at Mortlake, he would run down, on request, after his day's duties were over, to a *post-mortem*, to see a poor patient, or to take part in an experiment, returning as cheerily as though he had received the heaviest fee. This is but one example of his kindly nature.

He laid no claim to eloquence, nor had he that gift. A peculiar

huskiness of voice, indeed, rendered first hearings from him painful ; but this was soon felt less on acquaintance, and the ear once accustomed to the peculiarity, the mind was quickly interested in the matter of his discourse, for he always spoke earnestly, clearly, and to the point. In the Societies he spoke very often, and gave expression to views, on which he had spent great thought, with a generous freedom which, in so far as the fame of his originality was concerned, had been better held in reserve. It had been better, that is to say, for him to have carefully elaborated some of his views in the closet, and published them fully, than to have sent them forth in the hurry of debate. Had he lived, he would possibly have collected many stray labours thus put forward, and have given to them the matured consideration which they deserved. One of his views, on which he would have bestowed great attention, refers to the origin of various morbid growths, such as cancer. He believed that these morbid formations are all of local origin ; that they arise in the parts of the body where they are found, from some perversion of nutrition ; and that the constitutional effects are secondary to, and dependent on, the local disorder. He made many observations on this important subject, notices of which are to be found scattered, here and there, in the proceedings of the Medical Society of London, but no connected record was ever completed.

His private conversation was both instructive and amusing ; he was full of humorous anecdotes, which he told in a quiet and irresistibly droll style.

His replies, when under the fire of cross-question, were ready and common-sense. Once, as we have already told, he observed that sulphuric ether is safer than chloroform. "Why, then," said a listener, "do you not use ether?" "I use chloroform," he resumed, "for the same reason that you use phosphorus matches instead of the tinder box. An occasional risk never stands in the way of ready applicability." On another occasion, after one of the meetings of the Medical Society, when the subject of a specific cholera cell had been under debate, some one asked him, as a poser and rather ironically, where he thought the first cholera cell came from. "Exactly," he replied, with a shrewd look. "But to begin, do you tell *me* where the first tiger or the first upas tree came from ; nay, tell me where you came from yourself, and I will then tell you the origin of the first cholera cell, and give you the full history of the first case ; but I want a model before I venture on the description of ultimate facts."

As an author his style was plain, clear, and smoothly elegant. His argument was always carefully studied and carefully rendered. He sent manuscript to the printer which required scarcely a letter of correction. Both in writing and speaking he made the expression of truth his first business. Neither provocation nor temptation could ever lead him aside from that principle. His readings were select. He chiefly read scientific works, old and new. He had great relish for some of the old medical writers—the masters in physic. He had read Bacon, but agreed with Harvey's criticism that Bacon wrote science like a lord chancellor. He had a notion that there had been a history long previous to any we know of from existing records, in which the sciences generally had risen to a greater perfection than they are at this present. His conversance with Sprengel's *History of Medicine* had possibly led him to this opinion. He was fond of general history also, but studied it little. He never read novels, because the hours devoted to them were, he felt, hours thrown away. At the same time he enjoyed as much as any man ridiculous life-pictures naturally cast. When he came to see me, and leisure was with us, I often read to him some of the more amusing passages from Dickens and Thackeray, or from one of the older writers, as Swift. It was a new world to him, and provoked great fun. He would ask to have passages read over again, that he might better realise the conception. He himself observed human character shrewdly, and described it in its humorous phases so well that if he had written as he related he would have ranked as one of the great humourists of the age.

He thought severely of the reviewer's art, and would never of late review any book critically. If a book were good, it carried the review of its own merits; if it were bad, it were better left untouched. He, at all events, with so much original work before him, could not stop to criticise his compeers or their transactions. Let the dead bury their dead; he must march with the living while life gave power.

He admired art, and felt real pleasure in advancing it. He enjoyed innocent recreations, and was ever at home in the family circle. He had his regrets that he had never married; the fates had been against him permanently on that score. He loved the prattle and gaiety of children. When he went to court, arrayed in his court suit, nothing connected with the event delighted him so much as the saying of the child of a friend, who, on seeing him start, with his sword and flattened hat, held up her hands, and exclaimed, "Oh!

isn't Dr. Snow *pretty*, mamma?" The idea of being considered pretty roused in him quite a new and droll sensation, which he could not help repeating as a rare incident in a courtier's career. The anecdote is simple, but it gives a good idea of the genial and gentle nature of the man.

It has been shown that the tendency of Dr. Snow's mind for philosophical pursuits led him away in some measure from the practical drudgery of professional life. From this fact it has been too hastily inferred that he was therefore, in the common parlance, "not a practitioner." Those who knew him as a practitioner, and had reaped the advantage of his assistance in cases of doubt or difficulty, had a very different opinion. These, with one accord, spoke of him as having been, without any ostentation, one of the soundest and most acute of our modern physicians. He had great tact in diagnosis; an observant eye, a ready ear, a sound judgment, a memory admirably stored with the recollection of cases bearing on the one in point; and a faculty of grouping together symptoms and foreshadowing results, which very few men have possessed. For my part, I can bear truthful testimony to his eminent qualities as a practitioner, and to the fact that his philosophical labours only served to render him more intelligent and profound in matters relating to diseases and their treatment.

And, when the opportunity offered for obtaining remunerative practice by the exercise of true scientific skill, Snow showed himself, both in act and industry, competent for success. He soon overcame all difficulties, and managed by his frugality to lay in store for a rainy day for himself, and to help such friends as needed. Many rumours as to the extent of his gains abounded which it is right to correct. His largest income was £1,000 a year; it never exceeded that sum. For this he administered chloroform or other anæsthetic about four hundred and fifty times annually, taking an average of ten years preceding his death. In many cases his services were gratuitously supplied.

In his private relations Dr. Snow was a man of the strictest integrity and purest honour. The experiences of life, instead of entwining round him the vices of the world, had weaned him from the world. Without any pretence, maintaining no connection with sect or party, he carried out a practical religion, independently of any hypothesis or abstruse profession, which few professors could approach. A child of nature, he knew no way of recognising the Divine influences so purely as in silent and inexpressible admiration

of those grand external phenomena which each moment convey, to men of his character, the direct impression of a Power all-present and revealing itself for ever.

We approach the end. In the midst of his success, when medicine most valued him and his hand was most powerful, he stood one day in his mental strength, and the next day fell. Death found him at his duty.

On the morning of June 9th, 1858, while at work at the MS. of his last book, *On Chloroform and Other Anæsthetics*, he was seized suddenly with paralysis just as he had written the word *exit*: and on June 17th, at 3 p.m., he slept the euthanasia. He was buried in Brompton Cemetery, and over his grave a few of us who knew him best erected a simple memorial.

For John Snow, as a representative man of medicine of the Victorian era, we may claim the poetic thought, less the poetic expression, combined with industry, perseverance, and the courage to express his own opinions boldly when founded on what he honestly felt to be the truth, and, if not the whole truth, nothing but the truth.

He had a patience that was inexhaustible, a devotion for labour unsurpassed, and a slow but sure and reliant comprehension and comprehensiveness which were not easily seen because of their extent. He combined with a stolid firmness, distinctively Saxon, a rare talent for penetration into obscure problems, for casting aside objects which are coincident or accidental, and for seizing determinately the realities for which he sought.

These attributes, if they do not constitute genius, consecrate life; and, represented by and through a man, a family, or a nation, make the choicest history of the grandest eras.

John Brown, M.D., and the Brunonian System

IN the year 1786, a short, square man, of Sancho Panza build, came into London from Scotland, and as he passed along the streets was an object of much curious conversation. He carried himself with an air of great dignity. He wore a black suit of clothes, which threw into strong relief a brilliant red cheek and a suspiciously red nose. He spoke the broadest Scotch, and altogether figured as a character from the north, of a pronounced and singular type.

As he strutted along he met some gentlemen of the town who were good enough to converse with him, and who, when they discovered his *patois*, were also kind enough to treat him as one of themselves, as a right-down good fellow who deserved recognition in a strange land. They were clever in imitating his own dialect, and pretending to be proud of him as one of their countrymen, invited him to a friendly glass in a neighbouring tavern. In a very short time the jovial strangers and the dignified little man were at home together, bound by the common tie that ties so many in common ruin.

The convivial pleasure proving at last rather tiresome or tedious to some of the gentlemen, it was proposed that cards should supplement the course. The visitor was only too willing to accede: indeed, what better return could he make for so much politeness? But alas! these distinguished hosts were accustomed to play for money, after the fashion of all true gentlemen of the time, and their guest had no money. His purse was empty, but he had a note of introduction of an excellent character to Mr. John Murray, the bookseller of Fleet Street, founder of the great publishing house of that name, and grandfather of its present distinguished head. To John Murray he went, and explained with open-hearted simplicity

his wants and wishes. In the shrewd and careful man of business he found a good friend and faithful adviser, to the discomfiture of the gentlemen of the town, who saw him no more.*

The stranger to London, in this way protected by the well-known bookseller of Fleet Street, was at this time fifty years of age. He had passed through a strange, restless, and, on the whole, unsatisfactory life; and at last, disgusted with his career in the land of his birth, had come to the larger metropolis in the final hope of being recognised as a man of genius, and as a successful though long-neglected practitioner of the healing art.

Of all men, this man would, at first sight, be thought least likely to be the author of a new system of medicine, and least of all of a system which should for long years afterwards bear his name. Yet this was nevertheless the case, for he was none other than the famous though penniless John Brown, founder of the Brunonian system of medicine, which even in our own day has had its admirers and supporters.

As he is looked at on his first entrance into the streets of London, he suggests at once a man who has floundered on his way. Some of his contemporaries have looked upon him as a man of genius; and illustrious Cullen himself, who was most opposed to him, has acknowledged his talents. Yet he has floundered, floundered all the way of his course, floundered up to the grave, which is soon to receive him as his happiest home.

Beddoes, who appreciated him justly, accounts for this failure in plain and wise terms. Beddoes explains, what is true enough, that Brown was an innovator. For this reason of primary and for other reasons of secondary character he failed as a practitioner: failed, says Beddoes, because "public opinion can alone awe the body of established physicians in any country into toleration of innovators." Perhaps in the present instance the failure of public opinion to bring pressure to bear for the support of the great innovator was all for the best. But I must not anticipate.

What details there are of the early life of John Brown have been preserved by the Rector of the school of Dumfries, Mr. Wait. His birth, if Wait be correct, occurred in 1735-36, in the village of Lintlaws or Preston in the parish of Buncle in the county of Berwick. The condition of his parents is not known, but it is supposed that they were, as common saying goes, "poor and honest." At any

* For an account of this benefactor see a most interesting article entitled *The House of Murray*, in *Harper's Monthly Magazine* for September 1885.

rate, they were well enough off and thoughtful enough of his welfare to place him at school at Dunse, the place where the renowned Duns Scotus once flourished, respecting which fact he was not a little proud: two remarkable men, he and Duns, from the same school; Dunse men both of celebrity. Brown rose to first rank in the school, but his father dying and his mother marrying again, instead of proceeding to college he was bound apprentice to a weaver. The binding was quite ineffective, so it was unloosened, and the desk of the grammar school, under Mr. Cruickshank as master, became once more the genial centre of labour.

Wait, who was at school with him, tells us that he was regarded as a prodigy, and that his application was so intense he was seldom without a book in his hand. He was at this time, according to his fellow-student, of sober habits; exceedingly religious, and so attached to the sect of seceders, or *Whigs*, as they were called in Scotland, that he would have thought his salvation hazarded if he had heard or read the "profane discourses" of the Scotch Establishment. "He aspired to be the minister of a purer Church, of which it was expected that he would be a chosen vessel."

There are other reports of the early life of Brown, which modify, if true, what is stated above. It is said that he let himself out as a reaper of corn in order to obtain the means of releasing himself from the weaving business and of putting himself to school; regarding which statement there need be no important doubt, because it is quite certain that he was a youth of unusual courage, health, endurance, and perseverance. At the age of fifteen he walked during one summer day the whole distance of fifty miles from Berwick to Morpeth, in Northumberland; and later on in his career he once walked from four o'clock in the morning until two in the early morning of the day following, taking but one hour of rest for a hearty meal, and traversing "all sorts of ground, in roads and out, over smooth and plain, mountain and heath."

He remained at Dunse at school until he had nearly reached the age of twenty years, working very hard at his classics, becoming exceedingly proficient in Latin, and holding for a long time tenaciously by the seceding or dissenting sect to which he belonged, the Scottish Whigs of the then Scottish theology. In course of time a singular event in his life changed his career. In the Church he so despised the provincial synod of Merse and Teviotdale was held near to Dunse, and to this synod, out of curiosity, he was induced to go in company with some of his fellow-scholars. Not quite so shocked as

he ought to have been by the proceedings, he had the audacity to stay and hear the synodical sermon. The story got wind amongst the seceders ; the seceders were horrified at his conduct ; they called him up before them in session ; they rebuked him and threatened extremities. He was dogged ; refused to apologise, and, to save himself the dishonour of excommunication, he took time by the forelock and excommunicated them. He left them for good, and became by his profession a member of the Established and Apostolical Church, and an enthusiast in it, attacking vehemently David Hume, whose startling works were just then setting all Churchmen aghast, and the world at large by the ears.

From the school at Dunse, Brown passed in 1755 into the house of some family of distinction in the neighbourhood as a private classical teacher, but the engagement did not last long : perhaps he got tired of the work ; perhaps he did not make himself agreeable. However it might be, he left, and proceeded straight to Edinburgh, in order to pursue in the University there a classical and theological career. At first he was eminently successful in this direction of study ; he became renowned amongst his fellows as a classic, and he advanced so steadily in divinity that he was directed to deliver the test or prescribed discourse which precedes ordination. The discourse was delivered, but the preacher stayed there. It was his first sermon and his last. His principles in the theology of the Established Church became loose ; he threw up divinity as a study and pursuit, and returned to the school at Dunse in the capacity of usher, remaining as such for a whole year, and retiring from the post in the autumn of 1759 in order to compete—unsuccessfully—in a comparative trial for one of the classes in the High School of Edinburgh.

Defeated in his objects as a preacher and as a classical teacher, or disliking both vocations, Brown next directed his thoughts to medicine as a profession. He was rather advanced in life for a student of physic, and he had no means whatever wherewith to pay even the small sum which was then necessary in order to meet the expenses of his curriculum. But he had a resolute will, and his wit came in well to supplement his purse. There was before him in Edinburgh an opening for a medical “grinder” in Latin, and he took zealously to the “grind.” There were many youths destined for medicine who were quite unable to go through the ordeal of conversing with their examiners in the Latin tongue until they were brought up to the work by a master who would grind them up ; and of these Brown became the master.



Joannes Bruno

Another work, also similar, turned to his profit. A student had to prepare a thesis in Latin for the University examiners, and the student could not write the thesis in Latin. He wrote the thesis, therefore, in English, and Brown translated it into the classical tongue in fluent and eloquent style. He now "discovered his strength, and was ambitious of riding in his own carriage as a physician."

To make the attainment of this ambition surer, he next wrote, in his best Latin, a letter to the Professors of the University, asking permission to attend their courses. They replied graciously, and in 1759 he was fairly on his way towards securing a place amongst the *Æsculapian* fraternity.

In the years which followed he studied hard, but his progress was slow and much impeded by his labours as a grinder, labours necessary to procure the bread and cheese of life. He must converse in Latin with the aspiring graduates; he must turn English essays, good or bad, into good Latin; and, sometimes, he must compose the essay in good Latin from Alpha to Omega.

Under this pressure he encountered other and more serious obstacles. He had become a popular man amongst his fellow-pupils as a scholar; unfortunately he had become popular also as a jolly good fellow. He had become fond of the great mocker, and "in the languor of his countenance seemed to show that he had taken liberties with a constitution originally firm and vigorous." He was well off for a single man, but he lived high and was luxuriously generous.

In 1765 he gave up the single life, and in order to maintain a married life he started a collegiate boarding-house, which turned out at first a success. He soon had plenty of students living with him, but he treated them so well that they lived upon him, and brought him to ruin in a pecuniary point of view. Wait, who visited him at this period, found him, nevertheless, "happy in his family, and acquitting himself affectionately as a husband and a parent." He still frequented the medical "classes," and in order to perfect himself in anatomy he visited Leyden, where he was well received by the professors, and from whence he returned home bearing with him a splendid copy of the works of Albinus.

Under the ægis of Cullen, who made him his Latin secretary and private instructor of his family, he was now permitted to deliver an evening discourse, in which a Cullenian lecture of the morning was repeated and demonstrated. Thus patronised, he became a candidate for the vacant chair of the Theory of Medicine in the University of

Edinburgh. He had previously offered himself for some similar post, but, disdaining to ask for any recommendation, had been contemptuously refused. He now tried again on the same conditions, for "such was his simplicity," says one of his biographers, "that he seems to have conceived that nothing beyond pre-eminent qualifications was necessary to success ; nor did he harbour any suspicion of the debasing influence, which has infected the land so thoroughly, that the post of a scavenger, were it held by appointment, would hardly be procured without cavil, or retained without servility."

Once more he was unsuccessful. The magistrates of Edinburgh, with whom the appointment rested, are reported to have asked in derision who this candidate was ; and, unfortunately, it is further reported that Cullen, on being shown the name, asked, in the vulgar dialect of the country, "Why, sure, this can never be our Jock ?" Beddoes, who heard this story, hopes it may not be true. But later, Cullen completely estranged the heart of his Latin secretary, on his trying to gain admission into the Philosophical Society of Edinburgh. Brown, it is suspected, was advised by Cullen to withdraw his letter of application to the Society, but declined to withdraw it, was rejected, and from that moment until his death was the determined foe of his sometime protector and friend. Cullen was the "plotter" against his fortune, his family, and his fame—Cullen, after whom he had named his eldest son William Cullen, and his daughter Elizabeth Cullen Brown. The offence could never be forgiven. It was hard, for no one had ever before been subjected to the insult of rejection.

His difference with Cullen passed into absolute enmity, and led him to publish his first important work, *The Elements of Medicine*, which was so well received that he followed up the venture by delivering a course of lectures to the students of the University as an extra-academical course. It was amongst these students the term Brunonian arose. The students were called Brunonians.

The students who in this manner gave a temporary support to Brown were of a mixed character. Some were steady working men, who, failing to appreciate the now fading celebrity of Cullen, were caught by the new master and dazzled by his enthusiasm. Others were of a different type : they were of the rollicking sort, who enjoyed the company of their teacher when the lecture was over more keenly, perchance, than when it was being delivered.

By this time Brown had taken his degree as a Doctor of Medicine, but not in Edinburgh. He was too deep in war there to be likely

to find favour with the examiners. He therefore betook himself to St. Andrew's, where, according to his own account, he was received with great *éclat* by the professors, and graduated with much distinction.

I am indebted to the present distinguished Chandos Professor, Dr. Bell Pettigrew, of St. Andrew's, for the following record of this event in the life of Brown, and for the facsimile autograph, "Joannes Bruno," copied from the Archives of the University.

Extract from the Minutes of the Senatus Academicus of the University of St. Andrew's, of date 21st September, 1779 :—

"The Professor of Medicine represented to the meeting of University that one John Broun was in town desiring the degree of Doctor of Medicine. That Dr. Flint had examined him in presence of Mr. Cook, and prescribed to him the usual trials to be delivered before this meeting, which trials having been revised and approved of by the Examinators, Mr. Broun was called in and delivered the said trials to the satisfaction of the University. They accordingly unanimously agreed to confer the Degree of Medicine on him, and ordered his diploma accordingly."

In 1776 he was elected President of the Royal Medical Society of Edinburgh, and in 1780 the same honour was again conferred on him.

At this period in his career we arrive at what may be called the zenith of the reputation of the strange being who is before us. He is an accepted scholar, a qualified graduate in medicine, a teacher, and the acknowledged leader of a new system of medicine which bears his name. Moreover, like all such pronounced and pronouncing men, he has disciples, who swear by him and who are ready to go to extremes in defence of him and his doctrines ; he has also his enemies, who are plentiful, and ready at any moment morally to slay him.

A man so circumstanced must have in him some quality, some power, marking him out from other men and making him distinguished. He was distinguished through his "System." And here, as at a good resting-place, we may wait a few minutes to see what was the meaning and what the merit of that which made him famous, made him Brown the Brunonian.

THE BRUNONIAN SYSTEM.

The Brunonian system presumes to be based on physiological principles. The whole of it is included in the following propositions :—

(a) "In all states of life, men and other animals differ from themselves in their dead state, or from any other inanimate matter, in this property alone: they can be affected by *external* agents, as well as by *internal*, or functions peculiar to themselves, in such a manner that the phenomena peculiar to the living state can be produced. This proposition extends to everything that is vital in nature, and therefore applies to vegetables."

(b) "The external agents are reducible to heat, diet, and other substances taken into the stomach, the blood, the fluids secreted from the blood, and the air."

(c) "The internal agents, or functions of the body itself, namely, muscular contraction, sense or perception, energy of the brain in thinking and in exciting emotion or passion, produce the same effects."

(d) "If the property which distinguishes living from dead matter, or the operation of either of the two sets of powers be withdrawn, life ceases. Nothing else than the presence of these is necessary to life."

(e) "The property on which both sets of powers act may be named *excitability*, and the powers themselves, *exciting powers*."

(f) "The effects common to all the exciting powers are sense, motion, mental exertion, and passion."

(g) "The effect of the exciting powers acting upon the excitability may be denominated *excitement*."

(h) "Some of the exciting powers act by impulse; they may be denominated stimulants or stimuli, which may be universal or local."

(i) "What excitability is, or in what manner it is affected by the exciting powers, we do not know. But whatever it may be, whether a quality or a substance, a certain portion is assigned to every being upon the commencement of its living state. The quantity, or energy, is different in different animals, and in the same animals at different times."

(j) "The general powers produce all the phenomena of life, and the only operation by which they do so is stimulant; it follows, therefore, that the whole phenomena of life, every state and degree of health and disease, are also owing to stimulus, and to no other cause."

(k) "Excitement, the effect of the exciting powers, the true cause of life, is within certain boundaries proportional to the degree of stimulus. The degree of stimulus, when moderate, produces health; in a higher degree it gives occasion to diseases of excessive stimulus;

in a lower degree, or excessively weak, it induces those diseases which depend upon a deficiency of stimulus."

(*l*) "Every age and every constitution, if the excitement be properly directed, has its appropriate degree of vigour."

(*m*) "Life must be considered as a *forced state*. The body lives so long as the exciting powers act upon it through its excitability. If the exciting powers are removed from it, death is as certain as it would be if the excitability itself were withdrawn."

(*n*) "The seat of excitability in the living body is the medullary nervous matter, and muscular solids; to which the appellation of nervous system may be given. In this the excitability is inherent, but it is not different in different parts of its seat."

(*o*) "Every one of the exciting powers always affects some one part more than any other, and different powers affect different parts in this unequal manner. The affected part is generally that to which the power is directly applied."

Each of the different commentators of the Brunonian hypothesis has given an interpretation according to his own reading of it. I have chosen to abstract from the author himself the essentials of his system, and if I were to fill numerous pages with quotation I could not do more than I have done in the above.

In this purely mechanical day, when nothing is allowed that is not experimentally illustrated, the hypothesis of Brown may seem, and, I doubt not, does seem, a mere fancy. Yet when it is candidly considered it is very much more. As an abstract reading of vital phenomena it is indeed a most ingenious exposition, and shows that its author was a man gifted with curious insight, a man of genius of a very high order. To this day we have not come much nearer to the solution of the great question of life than the hypothetical solution which he advanced. Chemistry, it is true, has presented us with many details, but details and even experiments, and even facts, are of little service unless they explain principles and expose the plans of natural work. Brown had before him no experiment devised by man on which he chose to rely, but he had a keen sight for the experiments of Nature herself, and these he interpreted with ingenious speculative endeavour. It must be conceded, too, that he dropped upon an idea which lasts. His conception that every living thing is pervaded with some inherent quality or substance which is its natural portion, its allotted portion, and upon the stock of which its capability for life, long or short, depends, is as sound a view as has ever been

advanced, and explains more of the phenomena of life than any other. John Hunter, at a later day, called this quality or thing "the vital principle," and by this modified term the whole of the Hunterian doctrine of vitality may be read. Erasmus Darwin and Bichat got no further; and if in this day we were to say that the vital element, be it a quality or a substance, is a quality or substance daily renewed from without, and dependent on physical construction and capacity of the body for its greater or lesser presence in any particular organism, we are still thrown back on the difficult question:—What originally determines the capacity?

On the whole we may admit that there is a quality or substance which, whether it be from the first allotted, or whether it be regularly replenished, endows every living thing with life; and Brown, in describing this quality or substance by the term excitability, used as good a term as any other.

When, again, he described the exciting powers as the means by which the excitability is raised into action; when he said life is a forced state, brought about by the functions of external nature upon the permanent excitability resident in the body, he was still correct. As the spark which flies from flint and steel when they are struck together is the momentary evidence of something forced out by the concussion, so is life.

Had Brown been content to put forth the hypothesis which bears his name, he would have had no serious quarrel or opposition. But he could not rest on that simple proceeding; it was not likely that he could. Of what use was the most splendid conception if it had no application? How could he, plain John Brown, expect to ride in a carriage and roll in wealth and enjoy the fame of a leading physician on a hypothesis which was not capable of being applied for the alleviation and cure of disease? That would be impossible, and the clever speculation must, therefore, be made subservient to the purpose of obtaining the money, the carriage, and—heaven save the man as well as the mark!—the ephemeral fame or notoriety of being called by the multitude a great physician, without whose advice and aid it would barely be in fashion for the fashionable world even to die.

How many men of genius in medicine have split upon this deceitful rock, those only can tell best who have read the history of medicine with most care; and they know that there is not one instance on record of a physician of great original genius ever having been a physician esteemed great as a healer by the world at large. The combination is impossible; but Brown, very much affected with a

sense of dignity, and badly trained by a false mode of living, did not see the impossibility, and so floundered on, striving to be what he could never be, a practical dreamer and a practical man, according to the world's untutored ideal of practice as a means of securing a successful worldly career.

“Proh superi ! quantum mortalia pectora cæcæ noctis habent !”

BRUNONIAN PRACTICE.

With a certain kind of enthusiasm, which his own words and arguments sometimes show to be inconclusive even to himself, Brown tried to adapt his hypothesis to practice. He argued that, as in some persons there is implanted a certain measure of excitability, which is dead unless it be called into excitement or life by an exciting power or stimulant, so the whole of the changes or phenomena which we see in disease are due to errors of function existing between the excitability and the exciting powers. If the exciting powers do not call the excitability into action, there is set up a want of excitement or deficient life, a direct debility. If, on the other hand, the exciting powers are brought excessively into action, there is an exhaustion of the stock of excitability and indirect debility. In the end, in cases where life is most prolonged the excitability is at last exhausted ; and then, as the exciting powers have nothing left to act upon, there is final death. But during life, even in its prime, a large primitive stock of excitability may be knocked out of the body by an exciting power or stimulus, instantly as by a blow, more slowly, but still rapidly, as by the too frequently repeated stimulus of wine.

On these principles he divided diseases into two great classes, the *sthenic* and the *asthenic*. Diseases marked by over-excitement and induced by over-action of the exciting powers, he called *sthenic* ; diseases marked by feeble excitement, whether induced by deficient excitability or by feebleness of the exciting powers, he called *asthenic*. The two terms he invented for his system still remain in common acceptance.

Taking death, then, as the type of the final disease, Brown insisted that every disease is an approach to death, a result either of exhausted excitability or of deficient stimulus, in either case a result of debility.

To make his hypothesis bear more fully on practice, he went a degree further. He taught that where the excitability is wasted by any one stimulus there is still a reserve of it capable of being acted upon by another stimulus ; and to show the applicability of this

view he cited the case of a gentleman who under intense literary labour supported himself for forty hours, with alacrity, by frequently changing his stimulus. The first stimulus was a good dinner; then work with a glass of wine every hour for ten hours; then food, nourishing, but sparing in quantity; then work again with punch, not too strong. But sleep coming on under the pressure, he changed his stimulus. The punch was replaced by opium; more excitability was thus called out. In the forty hours the work was completed, and by continuation for five hours longer the proofs were read and corrected. "The succession of stimuli in this case was first food, next the stimulus of the intellectual faculties, wine, then the food varied, then punch, then opium, then punch and conversation."

With this extensive range of action by the employment of varied stimuli, Brown was able very easily to construct a speculative system of therapeutics and *régime* which necessarily had its fascinations.*

For the patient who was tired of one stimulating remedy he had always another; and as wine and other narcotic stimulants were the grand remedies, combined with excellent food, and mirth to act as the salt of the whole, he could not fail to win many followers. The marvel is that, with such a programme, he did not march up to the envied fortune and carriage at one stride.

As events turned out adversity befell poor Brown at every step, adversity and perplexity and trouble of every kind. His family was rather large—two sons and four daughters; he had no idea of economy; he was fond of keeping up appearances; and he was, at the same time, too generous and too careless about money to make any sufficient provision for his necessities.

Another obstacle stood also in his way. His habits were free even to dissipation. Dr. Beddoes relates that in 1782 he spent an evening in company with Dr. Brown, who without dispute assumed the sovereignty of the circle, which consisted chiefly of his disciples. "He displayed," says Beddoes, "uncommon vigour of imagination, but to me the figures he called up were so little agreeable, that I never desired his conversation a second time. Others received entertainment, and by those who knew him well he is remembered as 'the best companion in the world.' His Doric dialect had

* With not a little curiosity I notice, whilst this very essay has been on hand, that one of my distinguished provincial *confrères*, in the most perfect innocence of the connection, has been teaching Brunonian doctrine pure and simple in regard to the intermittent use of alcohol.

nothing prepossessing to an English ear. It was so broad as to leave me often uncertain of what he said even in his lectures."

To these disqualifications for success Dr. Brown added a pugnacious spirit amongst his cotemporaries. In politics he became a Jacobite, which was itself a sin, though one of little moment compared with the mortal professional sin of being heretically singular amongst his brethren. He had quarrelled with the mighty Cullen; he was at enmity with Alexander Munro; he was at war with nearly all the practitioners of his city. To meet these adversaries, he consorted much with the students of the university, surrounding himself with them as his disciples, and sharing liberally in their hilarious as well as their serious studies. To keep in with the students, he founded, in 1784, a Freemasons' Lodge, called *The Lodge of the Roman Eagle*, and turned the ritual of the Lodge into Latin, which language he spoke as fluently as he did his own.

His teaching from the lecturer's chair was, to say the least of it, eccentric. Sometimes he compared his discoveries with those of Newton, to his own advantage. At other times he grew wearied, and the enthusiasm of his young audiences waned with his own; under which circumstances, in accordance with his doctrine that his natural excitability required to be roused by different stimuli, he would place on the lecture table a bottle of whisky on one hand and a phial of laudanum on the other. He would mix forty or fifty drops of laudanum in a glass of whisky, take the draught off at the opening of the lecture, and repeat the dose four or five times during the discourse, working himself up to frenzy by the time of the peroration.

Once when he became affected with gout he partook freely of alcohol before dinner, and then called six of his pupils to join him at dinner, in order to demonstrate that whereas before he had entered into any degree of intoxication he could not put his inflamed foot to the ground and could only walk on his sound limb assisted by a crutch, he could after some intoxication use his affected leg in the most perfect manner. Greatly troubled with gout, he tried in the year 1775 to cure himself by abstinence, and for a time succeeded; but as the gout returned, and as the practice did not fit in with his system, he went back to the bottle, and stuck to it to the end.

These errors of his life, great as they were, might have been somewhat excused in a free-living age, had he not given mortal offence to his brethren by doing, as they believed, behind their backs, improper things to bring discredit on them. A student named Isaacson,

under the care of Dr. Duncan, an eminent practitioner of medicine in Edinburgh—there always is, from age to age, an eminent doctor of that name in Edinburgh—for a serious attack of fever, was being treated on the anti-phlogistic method of that day, a method extremely severe in its details. The patient did not go on favourably; and a friend of Brown, Dr. Robert Jones, a young graduate and staunch Brunonian, tampered with the nurse, to induce her to administer strong stimulants. The result was so good that when Duncan, with Munro, whom he had called in, next came to the patient, he, having no idea of what had been done, declared that the fever had disappeared. Later on the sufferer relapsed, and delirium having set in, Jones and the nurse became alarmed. In their fear they visited Brown clandestinely, when Brown, after giving the nurse a lecture on his system, adjured her, as she valued a fellow-creature's life, to repeat the stimulant. She did so, and, as one of the narrators of the story explains, "thanks be to fortune, skill, or virtue," the patient recovered. The recovery was a triumph to the disciples of Brown; and Duncan, naturally much enraged at the trick which had been played on him, unmasked the whole affair, and but for the interposition of Munro would have prosecuted Brown, and, as it was assumed, would have inflicted on him heavy punishment. In the end nothing more was done than to show that the Brunonian system was not adopted in such a form as to redound to its credit therapeutically.

In another instance of fever, in which the Brunonian system was tried openly and fully, the patient died notwithstanding. Brown, present at the post-mortem, was not to be beaten even under such adverse circumstances. He drew attention to the fact that the body had undergone no putrefactive change, and, the fact admitted, exclaimed with triumph, "Gentlemen, I appeal to you if we may not consider this as a clear proof of the propriety of our practice."

Both these incidents tended to add to the difficulties of the Brunonians and their master. The first compromised the character of the master as a physician; the second exposed him to ridicule, a still keener destruction.

THE LAST STRUGGLE.

On the Brunonian system medical Edinburgh got into a true state of sthenic disease. The *Elementa Medicinæ* of the author of the system appeared in 1780, and from that time the controversy waxed

hotter and hotter every day. In the Royal Medical Society the contests between the Cullenians and Brunonians raged to such a degree that duels were exchanged, until a special law of the Society expelling duellists was brought into operation. Students who quoted Brunonian doctrines in their examinations were severely treated, and all references to the *Elementa* in examination were interdicted. So matters grew worse and worse for the master, until at last, oppressed with debt and difficulties, he fell into prison, and delivered lectures there during his incarceration, until relieved by the present of £100 sent by an unknown friend, Lord Gardenstone.

Relieved from prison, but not from difficulty, Brown determined to cast from his feet the dust of Edinburgh and seek for fame in another and wider sphere. His name was ringing through England, Europe, and America. He would move to London. He was only fifty years of age, and his enthusiasm was undimmed. Towards London, therefore, in 1786, accompanied by his eldest son and his favourite daughter Euphemia, he made his way, setting forth from the Black Bull, near his own house in Richmond Street, Edinburgh.

His journey, as his son relates, was made by easy stages in a post-chaise. All along his route he found in village or town some old pupil or old fellow-student who was established in practice, to whom from the country inn he would despatch a note saying that a gentleman wished to see him. The meeting was always as cordial as it was unexpected, and a convocation of the gentlemen of the neighbourhood was the usual result. "The importunities and hospitalities of his old friends," his son relates, "protracted his journey so long that, in order to expedite the remainder of it, he thought proper to dismiss his postchaise at Doncaster and proceed in a stage-coach, that he might not any longer be tempted to stop on the road."

How he fared when he first entered London we have already seen, and I regret to say the record does not improve as it continues. He took a house in Golden Square, where he commenced to give lectures; he also gave lectures at a place called the Devil Tavern, in Fleet Street. He translated for the fee of fifty pounds his *Elementa Medicinæ* for J. Johnson, the well-known publisher of St. Paul's Churchyard. His house was thronged with his admirers and with learned men, but patients kept away. Failing to pay the bill for furnishing his house, he was arrested for debt and thrown into the King's Bench, from which he was liberated by the kindness once more of Mr. Murray, aided by Mr. Maddison. He now recommenced practice, and with more hope. Patients actually

began to visit him, his mental powers seemed to revive with the vigour of youth, he contemplated great designs, was about to begin a new course of lectures, had arranged to receive £500 for a treatise on gout, and had planned a review; when, on the 7th of October, 1788, after taking, according to his custom, a large dose of laudanum before going to rest, he was seized with apoplexy, from which he died.

Death made John Brown more famous than life. The students of Pavia went into mourning for him, all the world of science and of medicine rang with recognitions and remembrances, public subscriptions came in for the support of his family; and if the expression of his eldest daughter, Elizabeth Cullen Brown, who afterwards portrayed him as Dr. Maitland in a novel called *Passion and Reason*, that he was "the immortal genius of his country," was not fully granted, his genius was admitted, and always must be by candid scholars, as of high degree.

According to the tone of mind of his critics he has been differently described. Cullen could not help a certain sense of admiration for him. Beddoes, who did not personally like him, admits his own sentiments fluctuated so much respecting him, that he doubts whether he had been "consistent in his distribution of pity, ridicule, censure, and applause." Dr. Bartholemew Parr, a most competent judge, greatly admired his profound learning; and one of his other cotemporaries says of him: "He was possessed of a great mind that supported him in the midst of all his distresses. He despised riches, detested everything base, and possessed such openness of heart as to be liable to be taken in by every knave." All bear witness that he was a most affectionate husband and father.

That he was not sordid is proved by the fact that in the midst of his direst necessities he spurned, with all the contempt of his nature, an offer of a large sum by a speculator who wished to bring out an "exciting pill" bearing his name. That he was vain to weakness is equally certain from a fact suspected by Beddoes and other of his cotemporaries, and acknowledged to Mr. Pettigrew by Elizabeth Cullen Brown: that a work supporting the Brunonian system, published in 1781 as *An Inquiry into the State of Medicine, on the Principles of the Inductive Philosophy*, by Robert Jones, M.D. was really written by Brown himself, and not by the pupil whose name it bears. The same weakness is also shown in an anonymous work published in 1787, *On the Principles of the Old System of Physic. By a Gentleman conversant on the Subject*. This work,

which emanated from his own pen, is an ungentlemanly attack on the views of Cullen, whom to the last he never forgave.

Mr. Pettigrew, who had the advantage of knowing his family, opens the Life he has written of the founder of the Brunonian system in words with which I will bring to a close my own study of this gifted and wayward medical genius :—

“Thou art gone ;
And he who would assail thee in thy grave,
Oh ! let him pause.”

Richard Mead, M.D., F.R.S.

IN the year 1662, there lived in the village of Stepney one Mathew Mead, a distinguished Nonconformist divine. He was a man of simple and earnest life and manner, and was one of that band of two thousand Presbyterian ministers, the members of which, sacrificed to the perjury, the weakness, and the thoughtless cruelty of Charles the Second, and to the unconstitutional oppressions of his determined brother, the Duke of York, chose rather to give up their livings and homes, and become outcasts of the world, than do violence to conscience, or be guilty of subservience to iniquity.

The majority of these Nonconformists, brought thus to the touchstone of their faith, were reduced by the "Act of Uniformity" (passed in 1661) to actual beggary. But Mathew Mead had, by good fortune, an ample independent income. The loss of his benefice was of small consideration, and he continued not only to reside at Stepney, but, in the face of the canonical man who had usurped his place, to keep up his ministrations amongst his numerous flock. A stout heart had Mathew Mead, an untiring zeal, a generous soul. Terrible scenes of revenge, deaths by execution, and inconceivable horrors in the name of legality, were at this time being perpetrated, sufficient to frighten even an honest man out of his honesty. It was a period of a grand reaction, from an overstrained and unnatural attempt at supreme saintship, to one of moral anarchy and maniacal dominion of vice.

Mathew Mead bore up against these national calamities. The cross and the glory to him were one ; he spoke peace and virtue to his believing friends, declared the simplicity of true faith, stripped the idle ceremonialist of his tinsels, taught the grown man to worship God with the faith of a little child ; and by his own purity of life showed, in living example, the truth of the proverb, " Ille honorat



A. Mas.



Deum optime qui facit mentem suam similem Deo quantum fieri potest."

In these sentences we introduce to the reader the father of the distinguished man whose life-history is now before us, Dr. Richard Mead. It is fortunate, from an historical point of view, that I have in my possession a choice collection of biographical facts regarding our present great man. One work is of immense worth, because what it gives may be fully relied on. It happened that soon after the death of Dr. Mead, one of the writers (name unknown) of the *Journal Britannique* collected from the friends of the deceased many particulars, and therewith put together an authentic history, which was afterwards printed in English as a separate treatise.

Richard Mead, the eleventh child of his family, was born at Stepney on August 11th, 1673, the 13th year of Charles II. It was the proud desire of the excellent Mathew to give his children a good education, and in the fulfilment of this desire his large fortune was freely expended. He had in his house one Mr. John Nesbitt, afterwards an Independent minister, and under his tuition Richard remained until his tenth year. But now the reverses incident to individual independence, when the unscrupulous are in power, broke up the domestic happiness of the Mead family. In the latter part of the year 1682 the king, guided mainly by his brother the Duke of York, began to contemplate the exercise of an unlimited power over the corporations of large towns. In 1683 he commenced his usurpations on the Corporation of London, which he at length brought into miserable obedience. This done, other towns followed in the wake, and money was extorted for the royal purse from a host of corporations to secure charters which gave to them no essence of liberty. The English nation, which, not many years before, had rebelled against the First Charles for tyranny of a milder cast, bore these impositions with moderation. The terrors of the last revolution still vividly remembered, they sought peace at any price; and preferred rather to wear for a time the badge of serfdom than buckle on again the Ironside sword, submitting and submitting, because the memoirs of bloodshed among brothers were fresh in their minds, and because, in a division of political parties, there was a common weakness on which despotism could rest itself for a season, and sit commandingly insecure.

But, although the nation at large submitted thus quietly to the Stuart, the year 1683 was not without some shadow of insurrection, and the usual exhibitions of exemplary cruelty. Monmouth, Algernon

Sidney, Shaftesbury, Armstrong, Howard, and Russell joined hands in rebellion, though with purposes widely different. The most unworthy of these took part in the Rye House Plot, and the life of the king was saved, as it might be said, by a miracle, if it were not pretty clear in this, as in most similar instances, that the miracle agreed with its antecedent, the discovery of the plot. The plot detected, arrests and flights were thick as hail. The story need not be told in detail. Russell, whose soul was clear even of the thought of assassination, was fetched from his house to the Tower; to the bar, in the presence of the ruffian Jeffreys; to the block in Lincoln's Inn, in the presence of his weeping countrymen. Sidney met the same fate. Mathew Mead was suspected of having a connexion with the conspirators. Whether the suspicion was true or false is not forthcoming, but it is certain that he thought it his most prudent course to leave his dear country, and, following the instincts of Shaftesbury, to get across to Holland without delay.

The father a voluntary exile, and the family ties for a moment broken, Richard Mead was sent from home, and placed under the tutorship of Mr. Thomas Singleton, another Independent who had suffered from the "Act of Uniformity," by being made to resign for conscience' sake the position of second master of Eton School. Under Mr. Singleton's supervision Richard Mead progressed famously. He was a boy of immense natural powers; his memory was tenacious, his mind buoyant, his love universal, his industry unceasing. He acquired languages with facility, and versified eloquently. He remained with Mr. Singleton six years, and then went to Utrecht, to complete his humanities.

At this time (1689) there lived at Utrecht a man considered by his compeers as one of the most distinguished professors of history and eloquence of that period. This was Grævius, a man who in early life had been Professor of History at Deventer, but who was afterwards elected to the same chair in the University of Utrecht, and held it for well-nigh half a century. Grævius died in 1703, leaving behind his famous treatise on the antiquities and history of Italy, Naples, Sicily, Sardinia, Corsica, and the adjoining islands.

Under this teacher, then, Richard Mead commenced his academic career. He carried to the Professor a letter of introduction from his eldest brother, Samuel Mead, speaking greatly in favour of Richard, who was described as a modest youth, already advanced in a knowledge of polite letters.

At the University of Utrecht our scholar remained three years, when, having made up his mind to study and practise medicine, he went to Leyden, where he studied botany under Herman, and the theory and practice of medicine under Archibald Pitcairn, in whose house he lived with Boerhaave. It may be easily understood that these students, with tastes so similar and intellects so refined, were not slow in becoming friends. Their hands were soon exchanged in the firm grasp of true fellowship, and the affection that sprang up between them extended throughout their lives.

Pitcairn in his manner was cold, and to few educated under him did he transfer much cordiality. Mead, however, was a remarkable exception; for he, always retiring and at the same time fascinating, worked himself so far into the good graces of the stern professor that the latter not only became communicative, but received from the young student several observations which he afterwards embodied in his writings with all fair acknowledgment. His studies finished, Richard was joined by his eldest brother, Samuel Mead, by a Mr. Pollbill and Dr. Thomas Pollet, afterwards President of the Royal College of Physicians, and the four commenced their travels. They went to Italy first, where, says his biographer, Mead met with everything that could gratify his exact and refined taste for all that is great and beautiful. At Florence he had the curiosity to inquire for the *Tabula Isiaca*; but not being able to get any information about it, he desired leave to search for it in a lumber-room over the gallery. There he found this valuable piece of antiquity, buried in dust and rubbish, where it had been carelessly thrown, and during many years given up for lost.

In this year (1695) on August 16th, Mr. Mead was transformed into Dr. Mead, by taking at the University of Padua his degree of Doctor of Philosophy and Physic. Some time after this he went to Naples, and later to Rome, remained there a brief period, and, finally returning to his birthplace, settled down in practice in the house in which he was born, about the middle of the year 1696. He continued to practise in Stepney with great success until 1703, when, on being appointed physician to St. Thomas's Hospital, on May 5th of that year he removed to town, and took a house in Crutched Friars.

Prior to this he had gained a distinguished reputation, and many interesting events had occurred. In July, 1699, he married Ruth Marsh, the daughter of a London merchant. In the same year, on October 16th, brave Mathew Mead, the father, who had returned

from his exile and renewed his ministerial labours among the Non-conformists, died.

In 1702 Dr. Mead brought out his first literary work, entitled *A Mechanical Account of Poisons*, and shortly afterwards he prepared for the Royal Society an account of Dr. Bonomo's discoveries on the cutaneous worms which generate itch. This research led to his election as a Fellow of the Society, and gained for him the friendship of the greatest President that ever held office there—Sir Isaac Newton.

The work called the *Mechanical Account of Poisons* was published as a distinct treatise, but its author had already his admirers, one of whom, Mr. Samuel Morland, presented an analysis of it to the Royal Society, which analysis is printed in the twenty-third volume of the *Transactions*. The work itself consists of four essays. The first essay refers to the viper and its poison, and in it Mead settled for good a very important point—viz., that the viper emits a veritable poison with its bite. On this subject a warm contest had for some time been carried on. Rhedi believed in a veritable poison; Charas espoused a notion, held by Van Helmont, that the effects of the bite arose from the “enraged spirits of the animal, and that the yellow liquor was a pure and innocent saliva.” Mead supported Rhedi. The experiments conducted by him in this inquiry were simple, but bold and effective. He made vipers, when enraged, bite hard substances; he collected the fluid emitted, he inoculated other animals with the fluid, and produced the specific symptoms. The viper, he says, conveys its mischief by the yellow liquor which it emits into the wound through a slit near the extremity of the tooth.

At this time the microscope was in great repute among natural historians. It was a novel instrument in those days, but as popular as it is now. Our experimenter, therefore, must needs examine viper poison with this instrument. By this means he discovered the juice “to be full of little floating salts, which in a short time shot out themselves into crystals of an incredible tenuity and sharpness,” and which he defined in the sketch shown on the next page. On this discovery he based a peculiar theory as to the action of this poison on animals inoculated with it. As the blood contains little floating globules in immense numbers, he conjectured that the pointed salts present in the poison, upon being introduced into the blood, prick the globules, which being thus emptied of their contents, adhere, and being attracted in a manner different to what they were before, the texture of the remaining blood is broken.

The hypothesis of Mead was tinged with the mechanical views of his time, but his facts were most valuable. He proved the existence of a poison, and showed, by tasting it, that it was only poisonous when introduced by inoculation, thus proving the words of the poet :—

“Noxia serpentem est admisto sanguine pestis,
Morsu virus habent, et fatum dente minantur,
Pocula morte carent.”—*Lucan, Phars.*, IX. 614.

“We resolved,” he says, “to end our inquiries by tasting the venomous liquor. Accordingly, having diluted a quantity of it with a very little warm water, several of us ventured to put some of it upon the tip of our tongues. We all agreed that it tasted very sharp and fiery, as if the tongue had been struck through with something scalding or burning. This sensation went not off in one or two hours, and one gentleman, who would not be satisfied without



trying a large drop undiluted, found his tongue swelled with a little inflammation, and the soreness lasted two days. But neither his nor our boldness was attended with any ill consequence.”

At the end of his book he engraved, from an antique statue, a representation of a child holding out by the neck, in graceful figure, an enraged serpent, with this device : *Labor est Anguis superare.*

As a remedy for these poisonous bites, Mead refers to the actual cautery, the axungia viperina, and viper's flesh ; he concludes the essay by an account of some other poisonous animals, as the spider (in which he claims to have discovered the instrument conveying the poison), the scolopendra, and the scorpion.

The next essay relates to the tarantula and the mad dog. The remedy for a person bitten by the tarantula is said to be music, upon hearing which the patient often rises up and dances till he sweats out the malady. The third essay, which includes the consideration of arsenic, corrosive sublimate, various poisonous plants, and opium, is vague in its conjectures. The attempt is made to base every explanation on mechanical principles. Corrosive sublimate is made

up of saline crystals and mercury. The globules of mercury sublime, and lodge themselves in the pores and interstices of the saline crystals. The crystals are so many sharp blades, made more irresistible by the weight of the mercurial globules. Hence, in the stomach, these weighted particles corrode the parts. He mentions one curious historical fact regarding arsenic—viz., that this substance in time of plague was sometimes worn at the pit of the stomach as an amulet. This custom, he conjectures, had its origin in a mistake. "Perhaps some of the Arabian physicians had commended Darsini worn in a bag for a preservative in plague time. This, in their language, signifies cinnamon: but the Latin translators, retaining the same word in their translations, as was frequently done, one or other afterward not understanding its meaning, substituted in its place *de arsenico*, as if Darsini were all one with Zarnich."

The fourth essay is on venomous steams and damps, and is a very curious and interesting document. Here Mead describes his visit to the Grotto del Cane, and explains that the miasm there only rises to a certain height from the earth. But, again, he gets into mechanical argument, enters at great length into the mechanism of respiration, and rides his hobby till it has not a leg to stand upon.

Mead, installed in London, and made Physician to St. Thomas's Hospital, was soon a rising man. About the year 1704 he was elected on the Council of the Royal Society, an honour which was again bestowed in 1707. The changes in political affairs had all been in favour of the son of a Nonconformist. In the year 1707 the University of Oxford conferred on him the degree of Doctor of Physic, by a diploma dated the 4th of December. He continued his labours, practical and scientific, with unabated activity, and secured to himself the friendship and esteem of a large circle of learned and estimable friends.

About this time his labours were directed to the consideration of the influence of the sun and moon on animal bodies, labours which he made known to the scientific world in 1708, in a separate discourse.

The discourse is, perhaps, the most ingenious of all Mead's papers. As a medical document it may be of little value, but as a philosophical treatise it is at once original and far-seeing. There is no doubt that he was spurred on to the undertaking of this work by his friend Sir Isaac Newton. Not long before, Newton had brought forth some of his grand deductions regarding the tides. It

was Mead's idea, and he made it the basis of his argument, that "as the sea is, so must be the air." Following out this argument in favour of aerial tides as dependent on the influence of the sun and the moon, he showed that "the motion upwards of the air will be strongest of all about the equinoxes." Thus, applying in full to the atmosphere what Sir Isaac Newton had demonstrated in reference to the sea, Mead carried out his calculations with care and precision, and came finally to the grand conclusion, not only that the tides of the air are much greater than those of the ocean, "*but that these motions must both be universal, and also return at certain intervals.*"

Passing from the general or purely philosophical part of his discourse, Mead enters on the professional part of his subject. He connects in a loose manner epilepsy, vertigo, hysteria, palsy, hæmoptisis, and menstruation with lunar influences, and relates stories in which he has faith, but which we in these perverse days should send to the coast, for the bird tribe thereabout. "Kirckringius," says he, "knew a young gentlewoman, whose beauty depended upon the lunar force ; insomuch that at full moon she was young and handsome, but in the decrease of the planet so wan and ill-favoured that she was ashamed to go abroad till the return of the new moon gave fulness to her face and attraction to her charms."

Mead believed in the crises of diseases of the epidemic class, and with his definition of a crisis no modern one need quarrel: "A crisis is no more than the expulsion of morbid matter out of the body, through some or other of the secretory organs." But when he gets absorbed in his connections of this principle with lunar motion, the mist falls, and we are left in thick night. It is curious at the same time, in these wanderings of his, to trace out every here and there the origin of some popular idea which still holds place. Here is one example:—In many parts of England the poor, to this day, have a common notion that death takes place most frequently with the ebb of the tide. Whoever may practise medicine for a few months by the side of the Thames will soon become familiar with the question, "D'ye think he'll go off by turn of tide?" By-and-by, too, the practitioner will become so accustomed to the old query, that he will connect it more or less with the fact as it really occurs. The coincidence is indeed common, and the people have faith in it. With the true genius for observation, Dickens has got hold of this popular feeling, and makes Mr. Barkis go out with the waves into the great ocean of death. The man of science looks on this now as a fanciful hypothesis, but it once held such a different place in human

reverence, that our author, Dr. Mead, accepted it, and a Royal Society man, Paschal, took upon himself to explain it.

In the *Transactions of the Royal Society* for 1708-9 there is a paper from Dr. Mead on three cases of Hydrophobia. There is nothing special in these cases, except that in one the patient could not tolerate the appearance of anything white; and that in the dissections of two of these patients the operating anatomists pricked their fingers, and suffered from the effects of a poisoned wound, but recovered, showing no specific signs of the disease. An important observation this, though accidentally made.

Mead's pathological views on Hydrophobia were as follows :—"It is the effect of a particular kind of an inflammation in the blood, accompanied with so great a tension and dryness of the nervous membranes, and such an elasticity and force of the fluid with which they are filled, that the most common representations are made to the mind with too great effect, and the usual impressions of objects upon the organs cannot be suffered; hence proceed the timorousness, unaccountable anxiety and inquietude, which are always the forerunners of the dread of liquids." The cause of death in such cases, Mead thought, is an exhaustion, due to the violence of the actions and efforts of the sufferer. The barking symptom sometimes met with was observed by him, and was attributed to attempts to cough up mucus from the trachea. In one of his cases there was constant priapism, a symptom noticed by Cælius Aurelianus. In another of the cases the symptoms did not appear until three months after the bite, a fox that had been bitten by a dog being the animal that bit the man.

In 1711 Mead moved from his house in Crutched Friars to a house in Austin Friars, which had been previously tenanted by Dr. Howe, then deceased; and he was appointed to read the anatomical lectures at Surgeons' Hall, which office he filled with great success, and continued in it for seven years. He had also the favour of the distinguished Radcliffe, who assisted him in his career, and to whose great position he ultimately succeeded.

He had plenty on his hands now,—hospital visits, lectures, a new house, several children, an increasing practice, an extensive circle of friends, and the MS. of a new inquiry on his study table for filling up leisure chinks. A very busy time this in any man's life, yet a happy time too, the only happy time, if the man himself be by nature industrious, anxious, earnest, restless—like all men upon whom is placed the press-mark "First men." To such, starvation of mind

is a more serious penalty than starvation of body; they must do or die.

Hogarth, whose work will be seen in the accompanying sketch has made poor Mead take the dignified position of a militia drill-sergeant.*

The author of the amusing book called the *Gold-headed Cane* tells us with great unction about the illness of Queen Anne, and



about Mead being called in to consult with Arbuthnott and his colleagues. We cannot accept all that this imaginative writer says, but it seems from other testimony that Mead's presentment of danger was keen, and that, at his instigation, an account of Her Majesty's dangerous symptoms was sent to Hanover, as preparing the way for the departure of the first George for the kingship of England. This statement must not be received, however, as telling against Arbuthnott, to whom, notwithstanding the high intelligence of Mead, the

* For a copy of this unique drawing I was indebted to the late Mr. Squibb.

fair critic must award the first position as a man of intellect and genius. It is sufficient to know that no variance of a personal kind ever existed between the two ; they knew, understood, and respected each other, though Arbuthnott lost place, and Mead took up his court garment of favour. Radcliffe, it would seem, was first summoned to the consultation, but was ill with gout at Carshalton, and could not attend. Within three months after this event, viz., on November 1st, 1714, Radcliffe himself shuffled off existence ; and Mead, who had succeeded already to much of his practice,* now succeeded also to his house in Bloomsbury.

The distance of this house from St. Thomas's Hospital caused Mead to give up his appointment as physician to that institution on January 5th, 1716. The Committee returned their thanks, and honoured him with a governor's staff. On March 17th of this same year Bishop Burnet died, and Mead, Cheyne, and Sir Hans Sloane met in consultation in his case.

About this time Mead was engaged on an inquiry into the value of purgatives in the treatment of small-pox, as preventive of the seven-day fever. He seems to have thought he had made a valuable point in this treatment, but he did not publish any distinct work on the subject until many years afterwards. Meantime, however, he had communicated his ideas to Freind and Radcliffe, and in 1717 Freind, in a commentary on the first and third books of Hippocrates, published a letter on the above-named treatment, which he had received from Mead seven years before. Hereupon Dr. Woodward, whom we have met already in the Arbuthnott memoirs, published a book in opposition, called *The State of Physic and Diseases, with an Inquiry into the Causes of the late Increase of them, but more particularly of the Small-pox*. A literary battle followed, and much ill-feeling, which Mead did not forgive nor forget.

In 1717 Sir Isaac Newton gave to Mead the office of Vice-President of the Royal Society. Two years later Mrs. Mead died, leaving four out of eight children, three daughters and one son, Richard by name. In the same year the then Secretary of State, Mr. Craggs, gave to Mead a commission to make an inquiry into the best mode of stopping the progress of Plague, which disease was at that time prevalent at Marseilles. The result was the publication by Mead of his famous treatise, *A Short Discourse on Pestilential Contagion, and the Methods to be used to prevent it*. The discourse

* Radcliffe was elected M.P. for Buckingham in 1713, and at that time, virtually, had resigned practice.

was dedicated to Mr. Secretary Craggs, with the usual honours. It went through eight editions in three years, and although it did Mead honour as a medical work, it was said to be injurious to him socially, since it was thought to have a political meaning, and that in the recommendations so strongly urged by him for a strict quarantine, and for lazaretto lines of circumvallation, an intention was supplied for the erection of barracks and the support of a standing army at home. In time the fallacy of this popular rumour died away, and the honesty of the man was as fully recognised as before. The work on the Plague went through seven editions in one year, its author presenting copies of it to his more particular friends only. My own beloved friend, the late Dr. Francis Webb, F.S.A., possessed one of these handsomely-bound presentation copies. It was sent to the "noble Lady Pembroke," and bears on its first page, or rather fly-sheet, a compliment in the handwriting of Mead, the last two lines of which with the autograph are printed on the portrait accompanying this memoir.

In this work Mead expressed himself strongly in favour of the contagion theory, and having announced this dogma, his preservative measures were based upon it. Quarantine long—Quarantine strong—was the burthen of his argument. As to a specific remedy for the Plague, he opines that this is no more to be hoped for than is a specific preservative for the small-pox.

On the 9th April, 1716, Mead was admitted as a Fellow of the Royal College of Physicians, and acted as Censor until 1724. In 1717 he was elected (October 6th) Fellow of the Royal College of Physicians of Edinburgh. In 1721 (at the command of the Prince of Wales) he made the famous experiment of inoculating some condemned criminals for the small-pox. On six of the prisoners he tried the ordinary method, on the seventh he carried out the Chinese plan, slightly modified, by introducing into the nostrils a pledget wetted with matter taken from a ripe pustule. This succeeded. All the criminals contracted small-pox, except one, who had had the disease previously. They all recovered and saved their lives; going out of prison even safer than when they went in. The success attendant on this trial being thus declared, the two young princesses, Amelia and Caroline, were inoculated on April 17th, 1722. Both had the disease favourably; and so, unhappily, the practice, first introduced by Lady Mary Wortley Montagu, became so universal that England was made a common pest-house of this disease.

The notorious "Atterbury plot," as it has been called, occurred in

1722; and Freind, whose valour overcame his discretion, being then M.P. for Launceston, made himself so conspicuously opposed to the Government, that he was cast into prison on suspicion of being in the plot, and was there confined for many months. Mead took, meantime, the greater part of his practice, and used his best efforts for the liberation of his friend. He was allowed to visit the prisoner, and *Gold-headed Cane* dwells on one of these interviews, in which they discovered Freind writing a letter to his visitor. Freind stated that his time did not pass unpleasantly, as he was busy writing his *History of Physic*. *Gold-headed Cane* further tells us that Mead secured the liberation of Freind, the details of which appear under the life of Freind (p. 377).

In 1723 (October 18th) it fell to the lot of Mead to deliver the Harveian Oration at the College of Physicians. This oration was severely criticised by Dr. Middleton, the point in dispute being whether the Physicians of old Rome were or were not slaves. Mead said, No; Middleton said, Yes. The argument ran high, when Professor Ward came in to the rescue of Mead, and gave the victory to him. It is creditable to Middleton that, despite this learned fight, he retained his unabated regard for his antagonist.

The curtain rising after another year discovers Mead a second time taking to himself a wife. On August 14th, 1724, he married Anne, daughter of Sir Rowland Alston, of Odell, Baronet. The second Mrs. Mead outlived her husband, but had no children.

The *Gold-headed Cane* tells with minuteness the history of the last illness of the great Sir Isaac Newton:—"In 1726, early in the month of March, Mr. Conduit called upon my master, and carried him, together with Mr. Cheselden, to Kensington, where Sir Isaac had taken a house for the benefit of his health. On our first interview, it was pronounced that the illness of Sir Isaac arose from stone in the bladder, and no hopes were given of his recovery. We found him suffering great pain; but, though the drops of sweat ran down from his face with anguish, he never complained or cried out, or showed the least signs of peevishness or impatience. On Saturday, the 10th of March, he read the newspapers, and held a pretty long discourse with Dr. Mead, and had all his senses perfect. But at six o'clock on that evening he became insensible, remained so during the whole of Sunday, and died on Monday, the 20th, between one and two o'clock in the morning."

In 1727, on the accession of the Second George, Mead was appointed First Physician to His Majesty. His success at this

time was without parallel. He was consulted by all persons of consequence, and his doors were constantly thronged with the poor, to whom he not only gave his advice free of cost, but commonly added to it pecuniary assistance. His house was one great museum and treasury of learning and science. For a foreigner to come to London and not visit Mead was to omit one of the lion treats. He was accessible and courteous to every one. If an artist or writer, or ingenious man of any sort, were needy and in need, Mead was his refuge. A marble bust of Harvey, which he presented to the College of Physicians, from an original picture, was done by an artist under his patronage. He studied how to make remunerative work for the employment of others, and the study was to him a delight. If any benevolent man, with money in hand, wanted to expend it in charity, Mead pushed the matter home, and pointed the way. If an invention or experiment had to be tried, Mead must, of course, be invited to see it. If a valuable book, piece of art, or aught else of scientific, learned, or antiquarian lore, were brought to London, the chances were ten to one that Mead's museum or library would become the storehouse. His time was incessantly occupied; but the variety of occupation, and the simplicity of his habits, rendered his labours a pleasure and his life a constant enjoyment. "With respect to his manner of living," says the Gold-headed chronicler, "when not engaged at home, he generally spent his evenings at Button's coffee-house; and in the forenoons apothecaries used to come to him at Tom's, near Covent Garden, with written or verbal reports of cases, for which he prescribed without seeing the patient, and took half-guinea fees."

The history of Thuanus was brought out in full in this country through the liberal exertions of Dr. Mead. A Mr. Carte, who had been accused of high treason, and who had fled to Paris for safety, employed his time in collecting materials for an English translation of Thuanus. Mead, hearing of this, enlarged the design, and, having paid Carte for what he had already done, appointed Mr. Buckley to edit the work. Thus, under Mead's patronage, a perfect edition of the work was brought out, including three letters from Buckley to the Doctor explaining the character of the history, and the plan of the new edition. These letters were done into Latin by Professor Ward, and were placed in the front of the work, which was published in 1733 in seven folio volumes. In like manner he printed for private circulation Dr. Thomas Burnet's *De Statu Mortuorum et Resurgentium*.

We pass over a long series of years, during which we can follow the daily course of Dr. Mead imaginatively only, except to record that in 1735 he wrote a paper, not to the conviction of Boerhaave, recommending the use of a mixture of the *Lichen Cinereus Terrestris* and Pepper as a specific for hydrophobia, under the name of *Pulvis Antilyssus*; and that in the following year he, as joint executor with Lord Chief Justice Reeves of the will of Thomas Topham, Esq., bestowed on Eton College that gentleman's books and drawings. We may be assured that at this time he was not idle, for his librarian, Mr. Hocker, tells his *Britannique* biographer that in one year his master made £7,000, and for several years between £5,000 and £6,000. He was, however, too liberal to hoard up his fortunes. His table was at all times surrounded by friends and acquaintances, and he even had a second table, to which persons of an inferior position were welcome. Nor did he make all that he might have done by his practice, for of men of learning he would never take a fee. Bowyer, the printer and scholar, always, he tells us, consulted Mead, but was never allowed to pay for the advice. The same beneficence was extended to the clergy, from whom he was never known to accept money but on one occasion. The anecdote is related by Bowyer, and is authentic.

A Rev. Mr. Lake, fellow of St. John's College, Cambridge, was a nervous, excitable, dyspeptic man. He doctored himself by the rules and prescriptions of Cheyne. Becoming reduced by attending too strictly to Cheyne's prescribed regimen, or not understanding the matter sufficiently well, the invalid got worse, and at last came to London to consult Dr. Mead. In the presence of the great man, the patient gave him in detail all the plans he had followed in accordance with Cheyne's advice, as laid down in books. Mead, says Bowyer, "a proud man and passionate, damned Cheyne and his regimen. 'Follow my prescriptions,' said he, 'and I will set you up again.' But this was a disobedient, or, to use a common term, a crotchety patient, who would not go on without still dabbling in Cheyne. Might he follow such and such a rule of his golden author? was his constant query to the exasperated prescriber. At last the invalid, much improved, was about to leave, and, therefore, like an honest man and proper, asked his doctor what he was indebted to him. 'Ten guineas,' replied Mead; 'for though I have never before taken a fee of a clergyman you must not complain of being an exception, because you choose to prescribe to me, instead of following out my rules, and trusting to the advice you sought

from me.' With this he received the money, but told the patient he might call upon him once more, upon which occasion he returned six of the guineas."

The extended friendships which Mead made were all of the firmest kind: Cheselden, Garth, Arbuthnott, Pope, Newton, Halley, Burnet, Watson, Boerhaave, Pitcairn, Swift, and Sir Hans Sloane—these and others, 'little less illustrious, were his friends and scientific allies. Did any man ever before or since form the centre of such an immortal circle of genius, industry, and knowledge?

The only man almost with whom he was at variance was Woodward, the naturalist and doctor. Woodward was unfortunate generally in his friendships, for the reader will remember that between him and Arbuthnott no love was lost.* Why this dislike is rather difficult to say, for Woodward was an able man and independent. Master Wadd, gossip in general on things medical, gives an anecdote about Mead and Woodward which will bear recital.

In the prints of Ward's *Lives of the Gresham Professors* is a view of Gresham Gateway, entering from the Broad Street, and marked No. 25. Within the gateway are two figures, one standing, the other kneeling. These are Dr. Mead and Dr. Woodward. Woodward had done something professionally which offended Mead; Mead, therefore, meeting him in this place, when returning to his rooms in the college, drew, as did his adversary. In the combat Mead got fairly the advantage, and commanded poor Woodward to beg for his life. Woodward's answer was couched in excellent wit. "*No, Doctor, that I will not, till I am your patient.*" But Mead was inflexible, Woodward had to submit, and the picture represents him in the act of yielding up his sword.

The generosity of Mead was not confined to the scenes of his own home. It is a just tribute to him to say, that but for his energy and assistance the Foundling Hospital would in all possibility have never been erected. To this great institution he was one of the first contributors; and Captain Coram, the founder, was urged on to his work by the arguments of his Æsculapian friend.

"In like manner," says his *Britannique* historian,† "he persuaded Guy, the wealthy citizen, to lay out his immense fortune in building a new hospital for the reception and maintenance of the wretched

* See Arbuthnott Memoir.

† Hutchinson, in his *Biographica Medica*, takes every word he has to say about Mead from this writer, except the story about Lake, which he has from Bowyer. He acknowledges neither author.

and indigent who are discharged out of all others as incurable." After the death of the first president of Guy's the office was offered to Mead, who declined it on the ground, it has been presumed, that in his opinion the intentions of the founder had not been carried out by the managers.

Gold-headed Cane, who, like myself, begs hard from the Britan-nique gentleman, tells us that in 1746 he accompanied Mead to the house of Mr. (afterwards Sir) William Watson, in Aldersgate Street, to witness some experiments in electricity. A Leyden jar, then a new invention, was produced, and the Duke of Cumberland, recently returned from Scotland, took a shock from the point of the sword with which he had fought the battle of Culloden. "Two years after," continues the same authority, "we witnessed the famous experiments made on the Thames and at Shooter's Hill, in the presence of the President and several of the Fellows of the Royal Society; in one of which the electrical circuit was made to extend four miles, and the result of the experiment was, that the velocity of electricity seemed to be instantaneous."

As illustrating the attention which Mead was accustomed to show to every useful invention, we may refer to his exertions in behalf of Mr. Sutton, a gentleman who invented a new mode of ventilation. A history of this is given in Mead's works, together with a preface from him, and a short treatise on Scurvy. Mr. Sutton's plan of ventilation was proposed for ships chiefly, and was formed on the principle, "that a fire being always kept on board a ship, and a pipe or cavity made to the well, one end of it being heated by fire a change of air would follow, and by this means be rendered sweet and pure, and fit for respiration."

In a dilemma with the naval authorities, Sutton applied to Dr. Mead. He went direct to the Doctor's house, where he met Martin Folkes, President of the Royal Society. Both Mead and the President expressed their approbation, and the former soon after waited on the Lords of the Admiralty, and represented to them the great importance of the matter, whereupon they ordered that it should be tried on any of His Majesty's ships in the river.

After endless annoyances the experiment was prepared on a hulk at Deptford, in September 1741. Mead went there with Martin Folkes and the Lords. Sir Jacob Ackworth was there, doing the official, and was pleased to say that he was sorry they came so far to see so foolish an experiment; that he had himself tried it yesterday, and it would not shake a candle. The experiment, in spite of this,

succeeded, and the *Norwich* man-of-war was fitted up under Mr. Sutton's supervision. But soon there came in a new ministry, and the inventor was again thrown out of patronage, receiving for all his trouble and time only £100. The Rev. Dr. Hales' ventilating bellows obtained the ascendancy.

On February 11th, 1741-2, Dr. Mead brought Sutton's invention before the notice of the Royal Society. On April 1st Mr. Watson sent another paper to the Society on the same subject, and after many years letters patent were obtained, authorising the general application of the scheme to the whole navy. A copper model of Sutton's plan of ventilation was deposited by Dr. Mead in the Museum of the Royal Society. The plan fell, ultimately, into disuse.

A discourse by Mead on Scurvy is an interesting paper, giving the pathology of the disease, and the treatment by the use of vegetable acids. Some curious anecdotes are here and there supplied to illustrate various points. He records a conversation with Lord Anson, the famous voyager, with whom he seems to have been on very friendly terms.

In the year 1747 Mead brought out his treatise on Small-pox and Measles, and announced for the first time in a special work his views as to the treatment of the former disease. A considerable part of the work he wrote many years before. He says that, in 1708, he observed that many of the patients in St. Thomas's Hospital, suffering from a malignant small-pox, were saved, beyond expectation, by a looseness seizing them on the ninth or tenth day of the disease, and sometimes earlier. This led him to try the effect of administering laxatives in the decline of the disorder; and finding the plan succeed he adopted it, and was supported in his views and practice by Freind, who lost caste for his pains, and was obliged to defend himself warmly.

It has been already said that Woodward originally entered into a dispute on this question. Mead never forgave this offence, but twenty years after the death of his opponent, *i.e.* in the preface of the book now before us, gave vent in pitiless terms to his pent-up indignation, being absurdly indignant because poor Woodward was originally a linen-draper.

To the treatise on the Small-pox Mead added a translation of Rhazes' treatise; the Arabic copy he obtained from his "good friend the celebrated Dr. Boerhaave," of Leyden; but as it proved to be full of faults, he employed Solomon Negri, a native of Damascus,

and John Gagnier, Arabic reader at Oxford, to turn the treatise into Latin. These gentlemen did the work with diligence, and as the two versions differed, Dr. Thomas Hunt, Arabic Professor in the University of Oxford, compared the two Latin versions with the original, and out of them, in Mead's presence, made and arranged the translation.

A difference of opinion existed between Mead and Boerhaave in regard to small-pox. Mead did not, on his part, believe in the cure of the disease without suppuration. Boerhaave would not accept the purgative treatment.

As his declining years released him from medical fatigues, Mead devoted his time to the writing of the *Medica Sacra*, a strange production, including chapters on the disease of Job; the leprosy; the disease of Saul, Jeroboam, and Hezekiah; the disease of old age; the disease of Nebuchadnezzar; the palsy; demoniacs, and such like subjects.

His last work was *The Medical Precepts and Cautions*, a series of instructions selected without order from his loose papers; in this work the physician is himself again. Apoplexy, madness, pleurisy, fever, and many other cases are here discussed with much care and common sense; but the time has gone by for their application to practice. Now and then he relates a curious fact: as, for instance, the treatment of Dame Mary Page, who died in his time. Her monument, he says, "is still in Bunhill Fields, and on it is inscribed, by the patient's own request, the following":—

"Here lies Dame Mary Page,
Relict of Sir Gregory Page, Bart.
She departed this life March 2, 1728.
In 67 months she was tapped 66 times:
Had taken away 240 gallons of water,
Without ever repining at her case,
Or ever fearing the operation."

Mead speculates as to where the water came from, and thinks it must have been from the ovaries. He was the first to recommend firm pressure on the body after the tapping operation.

In various passages written at this period, Dr. Mead took occasion to revise and comment on many of his former views and opinions. The dread of inconsistency, which Emerson tells us is the hobgoblin of weak minds, haunted him not. He dared to examine, and explain, and retract his own earlier views.

Three years before death he became very corpulent, and his

faculties failed him ; but his geniality and love for his fellow-men remained ever unchanged.

Death caught Mead on Saturday, February 16th, 1754, he being then in his eighty-first year. He sank placidly into the unknown, after a few days of painless illness.

He was buried on the 23rd in the Temple Church, near his brother Samuel, counsellor-at-law, and a monument was there erected to his memory. Afterwards his son Richard (who, by the way, had a legacy of £800 left him by Lord Chief Justice Reeves) erected to his memory an honorary tomb in the north aisle of Westminster Abbey. The tomb bears an elegant inscription by Professor Ward, and is surmounted by an admirably carved bust.

Mead did not die rich, £20,000 being all that was left from him ; but his family were well cared for. His second daughter married Charles Bertie, Esq. ; his eldest, Dr. Edward Wilmot ; and his youngest, Dr. Frank Nichols. These last-named gentlemen were Physicians-in-Ordinary to the King.

A marble bust of Mead was taken by Roubillac, and was presented afterwards to the Royal College of Physicians by Dr. Askew ; a portrait of him was etched by Pond ; another by Richardson ; a mezzotint was taken by Houston from a portrait by Ramsay ; and a medal of him was struck long after his death by Lewis Pingo.

The house in Great Ormond Street which Mead occupied is now the Hospital for Children. At his death the vast treasures this house contained, its library of 6,592 volumes, its statues, pictures, and antiquities, were sold by auction, and dispersed to the four quarters. Many of his pictures brought immense sums of money.

Of our illustrious dead, no man in his day had so great and universal a celebrity as Mead. Indeed, there is possibly, in our biographical literature, but one other who gained in his lifetime so general a reputation. Boerhaave, his cotemporary, fellow-student, and beloved friend, is the exception ; and even he, despite the story that a dweller in the celestial empire of China wrote him a letter, addressed *Dr. Boerhaave, Europe*, did not achieve a greater renown. The King of Naples wrote to Mead, requesting a complete collection of his writings ; and in recompense forwarded to him the first volumes of Signor Bajardi's work on Antiquities, and invited him to his own palace, an invitation which was only unhappy in that it came too late. "The scarce and perhaps the only copy of Servetus' last book," says the Britannique writer, "passed from the shelves of our English worthy to those of his friend," M. de Boze. When the

Government wished for information on medical matters they sought out Mead, and when the colonies or the counties wished for physicians, they left the choice of such safely to his care. Young men going forth under his patronage met with the kindest attention ; he asked only, in return, for a note of their observations and doings ; while to every good thing they did he accorded every honour. A Whig in politics, he was too liberal to let political rancour efface merit or destroy friendship.

Filled with a true ambition, he courted but such notoriety as was honourable, and possessed the courage to decline the Presidency of the College of Physicians, when, by his enfeebled age, he was admonished that the trust were better left in younger and more active hands. Such were the mental traits of Richard Mead, and by these, rather than by any great profundity of intellect, he prospered. He had neither the brilliancy of Arbuthnott, the practical shrewdness of Wiseman, nor the genius of Harvey ; but his classical learning was greater than theirs, and at his crowded banquets he often was the only man that could hold converse with the visitors from the various nations who flocked around his table. His strength lay not in original thought, but in an ability of appreciating what was original in others ; not in imagination, but in memory ; not in keen, all-seeing over-seeing perception, but in calm, careful, industrious observation. Men of this class are rare, but when they appear, they are the commanders of their time. They are the ballast of science. To them even greater men show respect ; and if they embellish the age in which they live by no splendid triumphs or outpourings of genius, they give to it a tone and a solidity which preserves it in history as an age of progress without rant, and of knowledge without cant. Richard Mead was one of these common-sense ballast-men, and in his time and in his vocation he played his part second to none. His chosen motto was his life's precept—*Non sibi, sed toti.*

John Baptist Morgagni, M.D., F.R.S., and the Birth of Pathology

IN the early years of the seventeenth century, medicine as a science and an art had made the greatest advances she had ever made in the departments of anatomy and physiology. If the whole of her previous work, through all the ages, were put together in reference to these fundamental studies, it would probably be found that more had been advanced and taught in the fifteenth and sixteenth centuries than in the whole of the previous recorded history of the ages that preceded.

By this time there had been four great lights in true medical science. Mondinus had led the way in anatomy. He had broken through the superstition that prevented the act of "rifling," as it was said, "the bodies of the dead." He had even dissected the body of a woman, and in a work of singular distinction for its day had laid the foundations of anatomy. Mondinus had been followed by Vesalius, whose illustrious, chequered, and sad final career has already been recorded in these pages.

On the foundations laid by Mondinus, Vesalius erected the noble and stately pile of anatomical learning which stands to this hour, and will ever stand, as the work of a student of Nature who drew from herself, and whose exactitude is as clear and as definite as her own.

The next grand exponent of the elements of scientific medicine was our English Harvey, who, re-traversing the work of Vesalius, discovered with the keen eye of genius the animal machine in motion, and who did for the dynamical theory of vitality what his immortal predecessor had done for the statical. By these two remarkable men the body was discovered as a mechanism. The physical side of life became a distinct and recognised study, from

which there has been no decline, and from which medicine has been developed in a manner as daring in project as it has been useful in application.

Mondinus, Vesalius, and Harvey were followed by one who combined the genius and the industry of them all, and who added to their talents that of a knowledge and an appreciation of psychology. This succeeding pioneer was the illustrious Thomas Willis, known mostly by his immortal work *De Anima Brutorum*. It will be an early and delightful task to place a picture of Willis on these pages. Suffice it now to say that he supplemented what had been done by his predecessors with a series of researches on the nervous system that must remain as master-works so long as the history of science itself remains.

The anatomical and the physiological sides of medicine were, by these great scholars, and by others, very little inferior to them, and also very great, fairly brought before the world; but there remained a branch of medicine of the supremest moment still uncultivated. This was the branch of Pathology. It had not been forgotten, for Harvey himself had seen its vast importance, and in his lost and almost his last labours had composed a work upon it which, alas! never saw the light. Pathology was neglected, perhaps by necessity rather than intention, and therewith waited for its man to develop it.

The man who came to do the work that was wanted was he whose honoured name stands at the head of this chapter of great men in Medicine, John Baptist Morgagni.

Like so many of the great lights of learning of the later renaissance, Morgagni belonged to the Italian school. All through his long and industrious life he was favourably circumstanced. Like many illustrious men, he was the son of a mother who possessed a remarkable understanding. Her maiden name was Marie Tornielli, and she had the misfortune to lose her husband, the father of Morgagni, whilst her boy was yet a mere child. Bearing this great loss bravely, the widow devoted her life and talents to the education of this gifted son, John Baptist, and her care had indeed its reward.

John Baptist Morgagni was born on February 25th, in the year 1682. His birthplace was Forlì, in Romagna, the capital of a little Papal State lying at the foot of the Apennines, and to the south-east of Bologna. The place was famous for its beauty, and for containing a palace built after the designs of Michael Angelo. It was a place very small for a city, but favourable for the development of



Ioannes Baptista Morgagnus

Portrait by R. Blokhuy, Senr., Padua, 1718. Facsimile autograph from Archives of the Royal Society.



intelligence, being supplied with a good library, schools, and a college.

After passing through the elementary studies common to his time, Morgagni proceeded, at the age of fifteen years, to Bologna, and commenced at once to enter medicine as a student of two of the most celebrated professors of the age, namely, Albertini and the renowned Valsalva. In this happy position the enthusiastic student made his mark and his way with singular success. Valsalva was at this time in the zenith of his brilliant career as an anatomist; he was constructing the immortal work on the organ of hearing, which gave to the world the first true insights into the most wonderful piece of animal mechanism that exists in the animal body. The work was minute, and opened, as it progressed, the richest of discoveries and the very labyrinth of mysteries.

A good and youthful pupil was just what the illustrious anatomist required at that particular moment, and there was probably in all Italy not one who was better fitted for the responsible post than Morgagni, who entered into the work before him not only with enthusiasm, but with the steady industry and perseverance which afterwards signalised his whole career. In the public lecture theatre, as well as in the private dissecting-room, the young man laboured with assiduous care, and nearly all the dissections of the ear which the master (Valsalva) required for his demonstrations, or for his illustrations, were, under his own supervision, carried out by his pupil.

In the year 1701 the student entered into real professional status by taking a degree in his university of Doctor of Medicine and of Philosophy—a happy combination of qualifications which might, with much advantage, be restored at the present day, when so much of medicine and so little of philosophy is demanded of the student, to the manifest injury of both departments of knowledge. Happily, too, the evil genius of cram was no blight on the good genius of the rising scholar: there was nothing to wear out his mental powers before they were half developed. He was permitted to grow into healthy manhood of mind as well as body.

In the absence of Valsalva, the pupil was soon able to take the place of the master in the professorial chair, and in his twenty-third year he undertook the duty of president of an independent school or academy, which went on for a time, and then, for some reason which has never been explained, ceased to exist, or, as one of the biographers expresses it, “became forgotten.” He tried to fill the

new society with his own industry and his own ardour, but in a first effort, wanting in experience of the world and its ways, he failed. That is the long and the short of the whole transaction.

It could not, however, be expected that a will like that of Morgagni would be defeated by a single and a first failure; on the contrary, it stimulated him to fresh efforts, and so we see him leaving the scenes of his early labours in order to visit the great schools of science in Venice and Padua, so as to obtain a more intimate acquaintance with the details of the various parts which make up the proper curriculum of a completed medical career.

Up to this time the health of our student had not been so good as could have been desired. His severe application to work reduced his physical powers, and he suffered from some affection of the eyes, which forced him to give up his new studies for a season and return home in order to recruit and rest. The malady, whatever it was, seems soon to have passed away, for in the year 1715 we find him elevated to the chair of anatomy at Padua, in succession to Professor Guglielmini. Morgagni now held one of the highest places in the world as a medical teacher, and his reputation was secured.

In the days when Morgagni lived the position of a professor of the healing art in any one of the great departments of medicine was singularly exalted. The professor was the man of the time: every one looked up to him with respect, and the students who followed him looked up to him with actual reverence. The position was well earned, for the art of teaching in those happy days was an art not more important than it is now when conscientiously carried out, but an art which brought its own reward, and one to which the whole mind and energy of the man was directed, without let or hindrance.

The position secured for Morgagni at the opening period of his life was unusually fortunate for him and his career. It was fortunate also that the pursuit to which his life was devoted was in every sense congenial; there was nothing in it of any kind that savoured of labour, for he knew no labour. Of all the masters of physic whose lives I have read, not one seems to me so happy as that of Morgagni, in whose whole history there is but one record of a serious dispute with any adversary, and this terminated to his credit and victory both as a genial, honest gentleman and as a sound scholar.

The rival with whom he crossed swords in this single instance was one Jean Jacques Manget, a Swiss, who, originally intended for the Church, changed his course, passed over to medicine, and com-

menced to practise in Geneva, the place where he was born, and in which he flourished during a very long life. Manget was a hard worker in medicine. He was popular as a practitioner, and was a most laborious compiler of treatises on medicine, anatomy, and surgery—a bibliothèque of the most lavish quality. With the labour of the compiler this scholar combined, as is very often the case, a timid jealousy of men who, by natural parts and genius, surpassed him in originality of research and in comprehension of natural phenomena. To Morgagni he was a weak antagonist, troublesome as such little persons always are, but at no time a source of danger, and at all times easily put down if the labour of putting down be worth the effort.

Morgagni did once think the effort worth making, and was quickly the dignified conqueror.

Anatomy was the first and original study of our present master, and through all his life it was that part of science which he liked best and followed most devotedly. He added the accomplishment of completeness to many of the anatomical researches which previous to his time had been carried out by the great pioneers of the world of science to whom we are so deeply indebted. In this manner he revised anatomy, and corrected many of the minor errors into which his predecessors had inadvertently and almost necessarily fallen, and had he lived for no other purpose, he would have exhibited a brilliant and useful career. But he was destined to do more than correct the errors of his anatomical forefathers. He founded and he carried out a new branch of medical learning.

This new branch was Pathological Anatomy.

It is necessary, in studying the new work of Morgagni, to be exact as to the nature of it. It was not morbid anatomy simply; it was not pathology simply—it was strictly pathological anatomy. It is a curious fact that it should have been so, but the fact remains incontestable. It might be supposed that, in looking up the history of medicine from the point of its history when it began to recline on anatomy as its foundation, there would have been indications of a gradual step on and on, from ordinary anatomy to morbid anatomy, in mere descriptive form, without reference to the phenomena of disease which accompany morbid aberrations. Then it might be expected that an investigation of symptoms incident to morbid changes would be noted; and, finally, that there would be established upon these foundations of knowledge a true science of pathology. As the line of progress made its way in this particular department

the course of it ran differently, and for the sole reason that the man who at the particular juncture directed the course was a man whose genius led him to connect the external signs of disease with the changes of an anatomical nature that were going on in the seats of the disease. So the world of medicine and of science gained possession of the immortal book with which the name of Jean Baptist Morgagni will ever be connected, *The Seats and Causes of Disease*.

I do not, I trust, in this estimate of my present scholar, do any injustice to some who preceded him, or to others who were his contemporaries. Nothing could be further from my intention. My late much-respected and venerable colleague, Dr. William Cooke of Tower Hill, who, so far back as the year 1822, made an admirable abstract of the most important work of Morgagni, was of opinion that the distinguished Theophilus Bonetus ought to be accepted as the forerunner, and in some respects the master, of Morgagni, and that Lieutaud, Ruysch, and Baron Haller deserve to hold a place close by his side. It would be most unjust not to give to each and all of these men their proper meed of praise, and it would be unjust to deny Bonetus the well-won credit which Morgagni himself was ever anxious to give to him, in the statement that the famous *Sepulchretum Anatomicum* of Bonetus was the great storehouse of learning on the subject of diseased conditions of the body, from which the later and greater work took its origin. But Bonetus was a scholar without being a master, and herein lies the broad difference betwixt him and Morgagni—a wide distinction.

There was one other influence which largely assisted Morgagni in his early career, and which must not pass unnoticed. He was the pupil and intimate friend of one as great as himself, Valsalva. Valsalva had learned under Malpighi, and when that pre-eminent anatomist went to Parma on a visit had filled his place. From Valsalva, Morgagni learned the art of the teacher, and from him he also learned the study of practical medicine. It is matter of constant observation, whilst reading the *Seats and Causes*, to find the pupil, even in the latest years of his life, speaking of his master and his master's work. "This case was under the care of Valsalva," "This was the observation of Valsalva," and so on, page after page.

THE ORIGINAL WORK OF MORGAGNI.

As a literary worker Morgagni commenced at a very early age, and continued until a very late one. He issued his first essays, the

earliest section of the *Adversaria Anatomica*, in his twenty-fifth year; he issued his grandest treatise, the *Seats and Causes*, in his eighty-third year. He began, that is to say, to publish in the year 1704, and he finished in the year 1762-3, an interval of fifty-nine years, the longest I have been able to trace in all the histories of medical men of literary name and fame.

Between these two extreme periods he wrote several other works. The *Adversaria Anatomica* was extended from time to time until it reached five volumes, and recorded so many new and important facts in anatomy that it became one of the choicest books of its kind in the world of science, and gained for its author the admission to the leading societies of Europe. Our own Royal Society elected him a Fellow in 1724. The Academy of Sciences of Paris paid him the same honour in 1731, the Imperial Academy of St. Petersburg in 1735, and the Academy of Berlin in 1754. In brief, the fame of Morgagni resounded in every country where medical science was studied and practised. He was read and followed generally; but it may fairly be doubted if his reputation would have passed beyond his own age had he not sent himself down to posterity bearing the one work of his life, the *Seats and Causes of Disease*. This, therefore, must be the work calling for the principal share of our attention.

How this book came to see the light is told by the author of it himself in the introduction or preface. While he was paying a visit away from Padua he met with a student, whose manner, learning, and love of scientific research very much charmed him. This student—who, by the way, does not seem to have been a student of physic merely—was on his side so captivated with what he heard the master of physic tell respecting his observations about the sick, and about the causes of disease, that he was fain to induce the master to send him a series of epistles conveying, in writing, that which had fallen from him in speech, with such additions as might occur during the time that the composition was in progress. The request was accepted, and, after the promised letters were composed and despatched, they were sent back to Morgagni in order that they might be revised and prepared for press. By this means one of the most remarkable books in all medicine was given to the world.

The famous epistles were made up of matters originally derived from the widest and most prolonged experience, not only of disease, but of men and things. They also included the facts and observations of many other men than Morgagni himself. He constantly

quotes Valsalva, Bonetus, Wepfer, Vallisneri, Lansici, Haller, and many others, including Boerhaave and our own Richard Mead. To the whole of the authors whom he quotes he is just and courteous, but of them all his revered Valsalva holds the first place.

To this day no medical scholar can help being delighted and instructed by the study of this wonderful book. To move into it from the midst of the body of current medical literature is like passing from the periodical flux of current general literature to the perusal of the *Pilgrim's Progress*, a Shakesperean drama, or *Paradise Lost*. It is a transition from the mediocrity of incessant repetition of well-known truths told in long and hackneyed terms, back to descriptions derived direct from Nature and fresh from her treasury. It matters not where the book is opened, it is always good and instructive reading, full of suggestion, and rich in original narrative.

I open the book itself quite at random to prove the truth of this statement.

NOTES ON APOPLEXY, AND ON AIR IN THE VEINS.

The illustration that has been alighted on is on a case of apoplexy. According to his simple and effective manner, Morgagni begins by telling out the facts which relate to the symptoms. He then passes to the consideration of the causes of the symptoms, including the account of the dissections and the lesions that have been detected. Finally, he draws the conclusions which are deducible from the accumulated facts, and adds various suggestions, theoretical or practical, that may promise to be of service or to throw light on any peculiar difficulty.

In the case to which reference is now made, a woman, brought into the hospital to which Morgagni was connected, died of apoplexy within two days. She manifested no sense of feeling nor power of motion. On dissection some ovarian mischief was found, but the chief lesion was seated in the brain. The choroid plexus was turgid with blood, and there was a small quantity of water in the lateral ventricles, but there was no organic change discoverable in the cranial viscera.

The recital of facts is short enough, but sufficient to open up quite a new line of thought, and to afford the opportunity of raising various physiological questions bearing on the causes which gave rise to the phenomena.

The particular point which the subject here being considered opened up was the degree of compression which the brain can bear before symptoms of compression are manifested. Touching this point, Morgagni opines that there is a very great difference in effect according to the part of the brain to which the pressure is applied. If the pressure be localised, so that a small part only of the brain be acted on, the effect will, he thinks, be limited or localised, the effect becoming demonstrable in special symptoms; but if the pressure be upon the whole circumference of the brain, or if it be applied internally in such a manner as to affect the entire mass of the brain, then the result will be general, and will involve the whole of the body, as it did in the illustration on which the remarks were founded.

In further exposition of this argument, Morgagni proceeds to add an observation of Poupart's, relating to a woman, one-half of whose skull was deficient, and in whom, if the dura mater were ever so lightly touched, uneasiness was produced, and an immense number of little torches seemed to be lighted within or before the eyes.

Morgagni also expresses in this commentary, that whatever tends to cause an obstruction of the aorta, tends also to produce excessive determination of blood to the brain. He has seen this to occur in instances in which the aorta has been pressed on by a curvature of the spine, and from tumours impinging upon the abdominal part of that great vessel. Once he observed that the lateral branch of the left carotid artery was ruptured owing to the cause named, the aorta being compressed by an aneurismal tumour connected with the kidney, and causing, by pressure, paralysis of the right side of the body.

I do not remember any point relating to the effects of compression of the aorta at a distance from the arch that is of more importance than this observation. The reasoning seems to be that, if the column of blood through the main trunk of the aorta be compressed, then, as in anastomosis after an artery is tied, there will be a greater volume of blood thrown upon the other parts of the arterial circuit, and so there will be some pressure of blood upon the brain. The fact is so, as I myself have seen in quite a recent observation of a case in which the abdominal aorta was compressed by an aneurism of the coeliac axis. The symptoms of disturbed cerebral circulation, the signs of sparks and flashes, which the patient complained of as frequently passing before his eyes,

were singularly diagnostic when read by Morgagni's exposition, but which, in the absence of that exposition, were very obscure, and were a diagnostic puzzle to my learned friends concerned in the case as well as to myself.

One other excellent observation from this shrewd master of diagnosis, in his commentary upon the subject of pressure on the brain, relates to practice. It is bad practice, he says, to try to carry on intense study while the body is in a recumbent position; and he further adds, that in persons who are disposed to apoplexy there is often experienced a peculiar glow or degree of health a little time before the occurrence of the seizure, the brisker circulation incident to the sensation of good health being the actual cause of a pressure sufficient to lead to rupture of a weak cerebral vessel, or to effusion of fluid within the cranial cavity.

In another example of apoplexy, Morgagni attributes the affection to air in the vessels of the brain. The patient, an Ethiopian about thirty years of age, died suddenly from apoplexy whilst standing to play on the trumpet. He died at the moment when he fell.

Sanctorini made the post-mortem, requesting Morgagni to be present. There was rather a deficiency of blood in the sinuses, but wherever blood was found, throughout the body, it was in a fluid state. The vessels which passed over the corpus callosum, and those upon the upper surface of the brain and the basillary artery, were distended with air, but no bubbles were discovered in other vessels except those of the brain.

Morgagni takes occasion here to descant on the effect of the generation of air in the veins, and from what he tells us in relation to this subject we learn that the first experiments made to determine the effect of the introduction of air and other gases into the vessels were carried out by Wepfer and by some others of his time. It was found in these first experiments that if very little air were thrown into the veins of the lower animals the distress produced passed away after a time, and the animals recovered; but if a free quantity were forced in, then death followed. Animals as large as oxen were killed in this way, the death being always preceded by convulsive movements, and sometimes by opisthotonos.

Morgagni cautiously draws the inference that in some conditions of disease there may be a separation of air in the veins from decomposition of the blood, and that death may be the consequence of such separation.

APOPLEXY FROM VIOLENT SNEEZING.

In another page of the volume in hand there is a chapter of curious interest on a case in which a gentleman forty years of age was teased with violent sneezing at different periods. He was a bit of a Bacchanalian, and suffered from dyspnoea on climbing steps or a height. Excited one day by repeated convulsive attacks of sneezing, he was seized with dyspnoea and sense of constriction of the chest. Under this oppression he sneezed again, and suddenly died.

From the dissection Morgagni was of opinion that the cause of death was congestive apoplexy, and he is led by the facts presented to him to speculate on the reason why the Schneiderian membrane, when it is irritated, should draw the diaphragm into sympathetic action. Up to his time anatomists had affirmed that there is no connection between the first pair of nerves—the olfactory—and the phrenic, which is a cervical nerve. But, he adds, they forget the nerves which are transmitted from the fifth pair to the membrane of the nostril, and from which pair Meckel traced also a small branch on each side quite to the intercostals. By this mode of nervous communication he explains the sympathy between the olfactory and the diaphragm, and between the same nerve and the abdominal viscera.

In a further note Morgagni remarks on the sympathetic relationship which exists between the Schneiderian membrane and the abdominal viscera, from the symptoms presented to him in a young nobleman about whom he was consulted. This patient was subject to seizures of an epileptic nature, which always seemed to be caused by some derangement in the hypochondriac region, and which were preceded by the sense of a foetid odour, that was extremely annoying to this patient himself, but could not be detected by any one objectively, even when the observer was intentionally inhaling his breath. Hence Morgagni supposes that the irritation in the hypochondria, propagated through the intercostal nerves and by the nerves of Meckel to the nostrils, excited an action in the olfactory nerves similar to that caused by the effluvia of a foetid substance.

PNEUMO-PARESIS.

I find in another page the record of a disease attended by symptoms resembling those to designate which I have quite recently

invented the term *Pneumo-paresis*. The patient in this instance was the distinguished Vallisneri, the friend and once colleague of Morgagni. There was a mild epidemic of catarrhal fever in January 1730, and Vallisneri was seized with it on the twelfth of the month. He was sixty-nine years of age at the time, but the attack was so mild that when Morgagni on the fourth day called on him he found him convalescent, and congratulated him on his recovery, for he was sitting up in bed, and his countenance, voice, and general condition seemed to be the same as in health. On the next day he had still further improved ; but on the day following he was very much changed for the worse. His face was dark, his mind dejected, his breathing difficult, his voice weak, and coming as if from a cavern. In spite of these symptoms the patient thought himself none the worse, and he was free of pain. Morgagni intended to conceal his anxiety, but his face betrayed him. The pulse of Vallisneri was slow, and he told Morgagni that from the age of sixty it had been intermittent, but that during his illness it had been regular in its action. Within twenty-four hours Vallisneri expired.

A POINT OF PRACTICE FOR PRÆCORDIAL PAIN.

In cases of præcordial pain, Morgagni was accustomed to order the patient to immerse the arm of the affected side in hot water, which plan, in some of his experiences, gave, he says, such immediate relief that one patient derived nearly as much felicity from it as if he had been emancipated from instant death. In cases where there existed an insurmountable organic disease, an astonishing degree of relief was obtained by this simple process.

HEART DISEASE FROM ALCOHOL.

Morgagni was well aware of the dangerous influence of alcohol on the action of the heart, even when the heart itself does not give any indications of organic change. Through the nerves he thinks that the heart may be thrown into excessive action owing to reflected causes seated in other organs. In illustration he relates the case of a man who was brought into the hospital of St. Mary de Morte, at Bologna—to which he was attached—suffering from swooning and difficulty of breathing whenever he attempted to sleep, and who suffered also from pain in his right arm as if the arm were being torn in pieces. In this man pulsation extended from the region

of the heart to the region of the umbilicus. The pulsation was perceptible to the eye, and although it was most marked in the thorax, yet in the abdomen, near the umbilicus, it was so violent that when the hand was laid over the spot it was struck forcibly, leading to the inference that an abdominal as well as a thoracic aneurism existed. The patient himself felt the pulsation everywhere, even to the extremities of his toes. The carotid, the temporal, and the radial arteries were agitated by strong pulsations, and the feet were somewhat swollen.

The patient took scarcely any food, and was almost free of pain. After being four days in the hospital he expired during a fit of the dyspnoea.

At the post-mortem, which Morgagni carried out, he was much surprised to find so little organic mischief in the organs of the circulation. The heart was large, and in the course of the aorta from the heart to the bifurcation of the iliacs there were slight unequal sulci running longitudinally. But there was no aneurism and no dilatation. The colon was contracted into narrow cells; the stomach was much contracted, but this might be accounted for by the fact that the man had taken no food for several days; and the liver was hard, and marked with spots on its surface like a kind of small granules.

The commentary made by the master in this instance is most instructive, and indicates how keen was his appreciation of the causes of disease. The one cause of the symptoms in this patient was that of drinking wine in excess, and the vehement action of the heart and arteries arose, undoubtedly, from the same cause as that from which it arises in most persons during the incipency of aortic aneurism, namely, the influence of the nervous system on the action of the heart and great blood-vessels. Nothing tends more to induce this excessive action than a stimulant plan of diet. "In persons addicted to drinking," he adds, "I have known this to occur several times, and in all of them I believe the extreme pulsation was owing to the influence of the nerves, as there were no particular indications of other diseases, or, if there were, they sustained an intimate communication with the nervous system." When the heart is flaccid, he asks, how can it occasion a full and strong pulse, except through the influence of the brain and nerves?

According to Morgagni, aneurisms do not begin in the vessels from laxity of the membranes, injury, or ulceration, but from powerful action of the heart and arteries. The first lesion of the heart which

discovers itself is the appearance of sulci on the inner coat. After this, other injuries follow in the next coat earlier or later, in proportion to the impetus of the blood. From these facts he infers that much can be done in the early stages to arrest the progress of aneurism, by strict attention to matters of diet and regimen.

INFLUENCE OF THE MIND ON THE CIRCULATION.

Morgagni paid great attention to the subject of the influence of the mind on the circulation. He maintained that, under certain passions of the mind, the course of the blood through the lungs is often powerfully excited, and sometimes is as powerfully retarded. We cannot therefore, he says, be surprised if from violent efforts to suppress or conceal indignation aneurisms of the heart and the aorta should originate. Such is the power of the human passions in dilating the channels and receptacles of the blood, that Albertini justly deduced an argument from the absence of this influence in brutes, to account for these dilatations being rarely found in animals of the lower kingdom of life.

Respecting the seat of aneurism, he was of the opinion that at the curvature of the aorta, or very near it, aneurism of this vessel is most usually situated. The blood is driven into this part with greater impetus, and is, proportionately, repelled by the curve when the vessel contracts. But the blood is more easily received into the descending aorta than into the ascending, because it is shorter, has no branches, and is closed by the semilunar valves. Therefore aneurismal dilatations are more liable to happen between the curvature and the heart than in any other adjacent part. To this he adds the further excellent commentary that for the same reason aneurisms are far less frequently met with in the pulmonary artery than in the aorta, though that vessel appears to be no more capable of resisting the pressure of the right ventricle than the aorta is of resisting the left. The comparative infrequency must be due to the position of the artery.

Some other forms of excitement are named by Morgagni as causes of death from sudden rupture of an aneurism. In this respect venereal excitement is noticed as a frequent cause.

ON VARIATIONS OF THE PULSE.

Morgagni was an able observer of the pulse, and many of the notes which he has left on this subject are deserving of particular

study. He was conversant with the fact that whilst a strongly acting heart is usually coupled with a strong and vibrating pulse the reverse may obtain, and the heart may acquire a largely increased magnitude, and may yet become so weak as scarcely to be felt.

A section of clinical discourse on intermission of the pulse is full of practical information and wisdom. Morgagni looked on intermission of the circulation, when it is long-continued and severe, as a kind of asphyxia. Some years ago, in a paper on asphyxia commencing in the blood, I put forward the same idea on similar grounds. I did not know of the thoughts of our present master at that time, and therefore considered the observation original, as indeed it was, although I now see that another mind had forecast it.

In treating on the cause of intermission of the pulse Morgagni took a view that has been adopted rather largely in our own day—namely, that flatulency and disturbance of the alimentary tract is one of the most common causes; and he clearly understood that marked intermission may be presented in the absence of all organic affection of the heart itself. He was well aware of the nervous origin of intermittency, and of the development of that symptom from severe mental shocks and strains. He teaches that there are two kinds of intermittency, one short and temporary, the other more prolonged. The illustrious Lancisi was a sufferer from the long intermission for six years, and in him, according to his own testimony, it was *ex hypochondriorum consensu*. The two kinds of intermittency require different treatment. When the irregularity is dependent on the presence of disordered secretions lying in the alimentary canal, purgatives are the remedies; and he, Morgagni, relates an example in which, during fever in a maiden, an attack of intermittency was removed by a brisk purge. In other examples, where the symptom is due to mental oppression, he pursued a course of treatment that was of a soothing nature. A distinguished professor of physic at Bologna happened to discover that his pulse was intermittent, and being extremely anxious about it, was incessantly feeling his pulse, to discover that the evil was daily increasing. Morgagni's advice to this patient was to take his finger off his wrist and not to inquire too anxiously about his condition. The advice was followed, and the result was a complete removal of the disturbance.

It is a very singular truth that in describing the action of the nervous system on the circulation Morgagni shows that he was cognizant of the fact that the circulation may be disturbed by two sets of nervous irritations, one inflicted through the pneumogastrics,

the other "through those nerves which are subservient to the arteries." In one patient he observed great perturbations of the pulse in both wrists as the result of mental anxiety. But a day or two later the pulse derangement was confined to the left side altogether. The pulse of the right arm was quite regular, whilst that of the left arm still showed the inequality. When the mental distress was relieved, this pulse also became equal.

To Valsalva the credit is given by Morgagni of discovering that derangement of the heart and arteries may be mechanically induced by division of the pneumogastric nerve. But much praise is also bestowed on Molinelli, who practised tying the nerves instead of dividing them.

MISCELLANEOUS NOTES.

In the quotations given above, we have seen sufficient to show what a wide range of knowledge in the field of pathological anatomy and practice Morgagni possessed, and the points adduced very meagrely represent the fulness and richness of his knowledge. He was conversant with the fact that some forms of chronic bronchitis may be mistaken for phthisis pulmonalis, and are only correctly diagnosed by the effects of treatment, the bronchial cases being made clear by the fact of the recovery. He was quite aware that the obstructions sometimes met with in the heart, and called by the ancient medical writers *polypi*, are derived from the blood, and are in truth composed of the same substance as the buffy coat, the fibrine, of the blood. He observed, in some cases in which he had occasion to draw blood, that the odour of the blood was of a nauseous acid character. He recorded as a circumstance of special importance that quartan fever was occasionally ushered in with symptoms of an alarming apoplectic kind. He supported the practice of operating for the removal of cancer, whenever that can be done, not under the idea that the disease can thereby be cured, but because by early operation the speediest relief can be secured with the longest prolongation of life, under the condition of general disease incident to the constitutional taint. Many other methods had in his time, as in ours, been adopted for the removal of cancerous growths, and much false hope was often raised by such devices; but if removal of cancer were really necessary, then he seems to be certain that the quickest, the safest, and the surest mode of removal is by the knife, wielded by the hand of the skilful

surgeon. A century and a half has passed away since these reflections were penned, and still they remain as true and as practical as ever.

Unwilling to leave the great book on the *Seats and Causes of Disease*, I linger a moment more to peruse the chapters in it on diseases induced by poisons. Some of the poisons named are now out of date, and almost of remembrance. Rhododaphne is one of these, the juice of which appears to have had a powerful effect, and which had also about it this effect deserving of note, that it caused a fall in the temperature of the body. Another of the substances commonly in use in medicine in his day in the treatment of melancholia was hellebore. Hellebore must have been a very active drug, for in a dose of about half a drachm of the extract it proved fatal to a melancholic man who had taken it as a remedy. The hellebore caused death by vomiting, pain, and purging, so that probably its medicinal value, whatever that might be, was due to its action on the liver and on the alimentary system.

OPERA OMNIA.

The complete works published by Morgagni were:—

Adversaria Anatomica. Six parts: I. Bologna, 1706; II. and III. Padua, 1717; IV., V., and VI. Padua, 1719; and complete in five volumes, Leyden, 1741, and Bassano, 1765.

This work includes many important researches and discoveries in anatomy by Morgagni, and was the foundation of his early fame.

In Aurelium Celsum et Quintum Serenum Samonicum. Epistolæ quatuor. Padua, 1704 and 1721.

Nova Institutionum Medicarum Idea. Padua, 1712.

A treatise written on his appointment to the chair of theoretical medicine, and indicating the proper methods of study in the higher branches of medicine.

De Vitâ Guglielmini. Geneva, 1719.

A life of Guglielmini, written to accompany the completed works of that physician.

Epistolæ Anatomicae duæ novas Observationes et Animadversiones Complectentes quibus Anatome Augetur. Leyden, 1728.

A small book written in reference to a disputation with Bianchi on the subject of the structure of the liver. The work was edited by Boerhaave.

Epistolæ Anatomicæ Viri quæ ad Scripta pertinent Viginti Celeb Ant. Mar. Valsalvæ. 2 vols.; Venice, 1740.

Opuscula Miscellanea. Leyden, 1763.

In this work is included an essay on the lachrymal ducts, with others on glands and on urinary calculi.

De Sedibus et Causis Morborum per Anatomen Indagatis. 5 vols.; Bassano, 1761.

Opera Omnia. Bassano, 1765.

The work to which I have paid most attention, the famous *De Sedibus et Causis Morborum per Anatomen Indagatis*, has passed through ten editions, and in the year 1820 was re-edited in Paris by Chaussier and Adelon, in 8 vols. 8vo. It was translated into English by Dr. Benjamin Alexander, and was published in London in 3 vols. 4to, in the year 1769. In an abridged form it was republished in London in 2 vols., by Mr. (afterwards Dr.) William Cooke, an old and much valued friend of my own, who lived almost to the same age as the master he so much revered, and who retained his activity of mind until nearly the end of his long and useful career. To Cooke's edition of Morgagni I am greatly indebted for much useful information and assistance.

THE LAST WORD.

The portrait of Morgagni attached to this life of him testifies that he was a man of fine and noble countenance and of gentle expression; and everything that is said of him testifies also that he was precisely what he looked to be. He was essentially a fortunate man and a happy man. In comparatively early life he married a noble lady of Forli, one Paoli Vergieri, a companion for him who could not have been surpassed in judgment or in affection. They had a very large family, fifteen children, of whom eight were living at the time of his decease.

To a knowledge of the science and art of medicine Morgagni added the accomplishments of a man endowed with talent for all the refinements of art and polite literature. He gathered around him, as our own Mead did, the best scholars of his day. He so impressed the rulers of his time that he gained their universal friendship and support. The Senate of Venice elected him to his chair of anatomy at Padua; the King of Sardinia, Emanuel III., esteemed him as his friend; four Popes, Clements XI., XII., XIII.,

and Benedict XIV., paid him the same distinction, and Pope Benedict made reference to him in his *De Beatificatione Servorum Dei*.

To these honours, and to those which, as we have already seen, the great societies of learning in Europe gave to him, one other, perhaps the dearest of the dearest to him, was from the place of his nativity. The people of Forli, eight years before his demise, placed to his memory a bust of him in their public hall. The memorial bore beneath it the subjoined testimony to his worth :—

JO. BAPT. MORGAGNO, NOB. FOROL.
PATRIA.

INVENTIS, LIBRISQUE EJUS PROBATISSIMIS

UBIQUE GENTIUM ILLUSTRATA,

DECREVIT A.D. MDCCLXIII.

PONENDUM IN CELEBERRIMO HOC LOCO

MARMOREAM EFFIGIEM

AD HUC VIVENTIS.

And to this was added, around the pedestal, the further testimony :—

HIC EST, UT PERHIBENT DOCTORUM CORDA VIRORUM,
PRIMUS IN HUMANI CORPORIS HISTORIÂ.

To the last Morgagni retained his happy fate. His strong and robust constitution, his quiet and retiring habits, his abstemious mode of life, his persistent activity, tended, one and all, to bring to him the completed existence and the peaceful euthanasia.

In these specialistic days of learning a Morgagni could not be. His industry would win for him no respect, his philosophy no regard. Still, we may bear him in our minds, hoping that, when the husks of modern medical thought are winnowed into space, the opportunity may recur for such true grain of thought, as he possessed and sowed, to rise again.

René Théophile Hyacinthe Laennec, M.D., and the Discovery of Mediate Auscultation by the Stethoscope

THE FIRST ACCOUNT OF A GREAT DISCOVERY.

“IN 1816 I was consulted by a young woman labouring under general symptoms of diseased heart, and in whose case percussion and the application of the hand were of little avail on account of the great degree of fatness. The other method just mentioned—immediate auscultation—being rendered inadmissible by the age and sex of the patient, I happened to recollect a simple and well-known fact in acoustics, and fancied, at the same time, that it might be turned to some use on the present occasion. The fact I allude to is the augmented impression of sound when conveyed through certain solid bodies, as when we hear the scratch of a pin at one end of a piece of wood on applying our ear to the other. Immediately, on this suggestion, I rolled a quire of paper into a kind of cylinder, and applied one end of it to the region of the heart and the other to my ear, and was not a little surprised and pleased to find that I could thereby perceive the action of the heart in a manner much more clear and distinct than I had ever been able to do by the immediate application of the ear. From this moment I imagined that the circumstance might furnish means for enabling us to ascertain the character, not only of the action of the heart, but of every species of sound produced by the motion of all the thoracic viscera, and, consequently, for the exploration of the respiration, the voice, the rattle, and perhaps even the fluctuation of fluid extravasated in the pleura or pericardium. With this conviction, I forthwith commenced, at the Hospital Necker, a series of observations, which have been continued to the present time. The consequence is that



RENÉ THÉOPHILE HYACINTHE LAENNEC, M.D.

Portrait from Sir John Forbes "Life of Laennec." 1847.



I have been enabled to discover a set of new signs of diseases of the chest, for the most part certain, simple, and prominent, and calculated, perhaps, to render the diagnosis of the diseases of the lungs, heart, and pleura as decided and circumstantial as the indications furnished to the surgeon by the introduction of the finger or the sound in the complaints wherein these are used."

The above are the sentences written by the man whose name stands at the head of this article, the illustrious Laennec, the discoverer of the process of mediate auscultation and the inventor of the stethoscope. They supply, in the briefest possible language, the history of the happy circumstance which led to the introduction of that knowing little instrument the stethoscope, for medical investigation, into every consulting-room of the world where medicine is practised.

"A wooden cylinder, a foot long, from eighteen to twenty lines in diameter, divisible in the middle of its length by a screw"—to render it conveniently portable—"pierced in the centre by a tube nine lines in circumference, but terminating at one end by a tunnel-like cavity, about an inch and a half in longitudinal dimension, and of nearly an equal extent in diameter at its large extremity, with a sort of plug, itself pierced in the middle by a canal three lines in diameter, to be occasionally inserted into this tunnel, by which it is rendered a simple cylinder."

This is the description of the instrument used by M. Laennec, and to which he applied the now well-known name of *Stethoscope*; and this was the language in which the discovery of the stethoscope was brought before the medical profession of Great Britain on January 20th, 1820, on page 165 of the *London Medical and Physical Journal*, probably by Dr. Granville, F.R.S., at that time, and for two or three years later, the editor-in-chief of the one leading journal of medicine in this country.

The description of the instrument so supplied is followed by a commentary on the use and promise of it, in the same periodical. We ask ourselves in these days, How could we practise without the stethoscope? The predecessors of the practice to which it led were inclined to wonder what place and what good it would fulfil. Even at a later day, when the "listening tube" had got quite into fashion, there were pupils, and favourite pupils, of Laennec himself who said

that were it not for the admirable manner in which the Master described the phenomena of thoracic disease, and added to the domain of pathology, the introduction of the stethoscope would have been a mere casual incident destined to come and go and bring forth no fruit.

There were also some who, after all the great truths respecting the value of the stethoscope were widely known, still looked upon it as a toy. One of the old practitioners, who in the first days of my own career "did very well without the tube," and who looked on the process of "sounding the chest" as an agreeable way of spending the time, asked when I got my first new instrument whether I didn't "expect to hear the grass grow through it." Such is the incredulity respecting things which partake of innovation.

Laennec could afford to wait for the death of all these objections. He did not live to hear many of them, for in the prime of his life he died.

Laennec was the last of the few of the greatest of sons of genius of Æsculapius. In this respect he followed Xavier Bichat, so that France has the double honour of producing the two real immortals of medicine of the whole of the nineteenth century. Considering the terrible troubles which France has passed through in the century, the depression she has laboured under from the tyranny of incompetent and pretentious emperors and kings, it is truly wonderful that her science in any department, and in medicine particularly, should have shown such a magnificent and exceptional record.

The difficulties with which the genius of sound innovation has to contend were never more fully indicated than in the first notice in English literature of the stethoscope. The writer regrets that Laennec should have laid out his work in such a mode as to make the principal object of his work the designation of "the advantage that may be derived from the use of the cylinder in distinguishing the different lesions of the lungs and rendering everything else subordinate to the design, the facts in pathological anatomy, although occupying a greater extent of space, being inserted merely as accessories." Under these impressions as to the value of the new means of diagnosis, the writer of the critique actually reverses the order of his author, and lets the pathology engage his first attention, treating of the new means of diagnosis in a secondary way, "as it is treated of in medical writings in general." Two years later, when the work of Dr.—in later time Sir John—Forbes on Laennec, with a translation of Laennec's treatise, was under review, he (Forbes)

was also complimented that he had grounded his arrangement on "pathological principles, which are unquestionably less precarious and less fleeting than those derived from diagnostic characters dependent on a new mode of instrumental exploration." In short, Laennec's work was looked on as a book of reference in pathology, and in this respect was ranked with the classic work of Morgagni.

Such was the reception in England of Laennec's grand triumph; it shared, at first, almost the same treatment in France itself, quite the same in Germany and in America. It disclosed one of the purest and most individual discoveries ever made in the history of science; it called forth no jealousy; it had no suffering of rivalry: not a man got up and said, "I did that," not a man even got up and said, "I had thought before of this, but by some extraordinary accident did not make it known." No! The actual simplicity of the discovery, coupled with its overwhelming usefulness, concealed its greatness until its history was made, and its originator stood alone in his glory.

We are indebted to Forbes for the most concise and correct account extant of the life and work of Laennec. Forbes, in one of the few delightful hours which I was privileged in my young days to pass with him, told me that Laennec, when he was in his prime, was as much distinguished by the simplicity of his manner as by the greatness of his character. No one was jealous of Laennec, but every one was sorry for him because in the midst of his devotion to the work of his life he suffered so acutely, and held to his duties with such unflinching zeal when his physical powers were quite unequal to the strain to which they were subjected. His students learned from him as if he and they were learning together. This same testimony was borne to me by other cotemporaries: by the late Dr. Robert Willis, of Barnes, and the late Dr. Cowan, of Reading.

BIRTH AND EARLY DAYS.

The full name of Laennec was René Théophile Hyacinthe Laennec. He was a native of a little town called Quimper, situated in Lower Brittany, about a hundred and thirty-four miles north-west of Nantes. It is a busy little town, possessing a small harbour, and rather famous as a centre for the product of sardines, which are taken in large quantities in the sea off the neighbouring coast. The town is also celebrated for its cathedral, a Gothic building of the fifteenth century,

and is well provided with schools and seminaries. The people of the place in the time of Laennec spoke a language peculiarly their own, which Laennec learned from his cradle, and which was more than once of practical service to him in after-life. He was born in Quimper on the 17th of February, 1781. His father, according to Forbes, who is supported on the point by the French biographers, was a man of very superior abilities. The father, an advocate by profession, was more than an advocate, for he was considered to be a good classical scholar and gifted with a poetic genius, which led him somewhat astray from the hard and narrow path belonging to those members of the legal fraternity who stick to their calling as the one object of their lives. Forbes is inclined to rejoice that the talented son of this versatile lawyer was not led away by the same dominant genius ; but it is more than probable that if the father had not been gifted even with a wandering genius, the son had been poor in that genius and gift of observation which made him what he became, one of the lights of the world of science and bearers of practical usefulness to mankind.

The details of the earliest education of Laennec are not recorded, nor does it appear that at first he was destined for the profession of medicine ; it would seem, indeed, that he was intended for the Church, for whilst quite young he was sent to a little parish called Elian, near to Quimper, where an uncle of his, on his father's side, an ecclesiastic of some note, took him in charge and, for a time, superintended his education, instilling into his mind those early lessons which made him all through his life one of the devoutest sons of the Catholic Church that has Rome for its centre. The education he was receiving under this uncle was brought to an early termination by two causes : the first, the elevation of the ecclesiastic to a more distinguished place in the Church ; the second, the after-changes in the Church itself as a result of the great Revolution, by which the clergy were generally dispersed and their benefices sacrificed. Laennec under these circumstances went from Elian to Nantes, where another paternal uncle lived in practice as a physician. Here our young scholar found a second father in one who was devoted to the science and art of physic, and who cultivated both, in combination with a wide and liberal learning.

In the commencement of his career at Nantes, Laennec pursued the general studies of the junior scholar, and distinguished himself by his industry, brightness of intellect, and excellence of disposition. The school in which he studied was in the department of the Lower

Loire, and whilst there he made up his mind to accept medicine as the profession of his life.

Dr. Laennec at the time of his nephew's introduction into medicine was in marked repute in Nantes as a physician, and was senior physician to the hospital of the place. He was also Professor of Medicine and of *Materia Medica*—two chairs which were often entrusted to one professor in those days—in the Academy or School of Medicine of Nantes. The introduction, therefore, was of the best order, and afforded the student opportunities which were duly appreciated and duly sustained. He soon made his mark as a sound and observant student, and won the affection as freely as he gained the admiration of his compeers.

The political exigencies of the period, so critical in the history of France, caused the establishment in Nantes, as in other previously peaceable towns of the country, of a large military centre, in which many soldiers were lodged, for whom it became requisite to open efficient military hospitals. The military hospital system was a necessity of the disorder that was then in its birth, and being hastily brought into existence, was not very perfect in its organisation. As many men as could be got at a moment's notice to act as medical officers were inducted into the service; and young Laennec, at the age of nineteen, a mere tyro and pupil, was passed into the office of surgeon to the troops. He acted for a while at Nantes itself, but was sent from thence into the west with a body of troops, in order to accompany them while endeavouring to quell, not very satisfactorily, some disturbances which had arisen in the Morbihan district, a large tract of country, part of which lies on the shore of the Bay of Biscay, and in which Belle Isle, with many other islands, is included. He was as yet unqualified; and, probably for the purpose of completing his studies and taking up his degree, he left the service of the army in the year 1800, after about twelve months of military medical practice, and removed to Paris, attaching himself to the Clinical School of La Charité, and commencing to attend the lectures on anatomy and other classes in the School of Medicine of the great capital.

THE MEDICAL STUDENT.

The competition in the schools at this particular period was excessively active, and rivalry in the medical fraternity amounted really to a kind of civil war. The spirit of medicine moved with the spirit

of the age ; and men fought, and won, and lost in contests on the nature of disease and its treatment almost as furiously as they fought in the senate and the tribune about the political troubles in which the nation was plunged. Laennec took his side in these contests, but with singular good-temper and perspicuity of judgment. At La Charité he became the favourite of the distinguished master of physic Corvisart, whose works are, or at all events were, as familiar to English practitioners as to those of his own race. He remained under Corvisart for three years, and was so devoted to his clinical studies that, according to Forbes, who had the statement from Dr. Meriadec Laennec, cousin of our great man, he drew up a minute history of nearly four hundred cases of disease.

In the period of his studentship Laennec made the warm friendship of the eminent medical scholar Bayle, who, as his senior, gave him the best advice and assistance. Between the two illustrious physicians there seems to have been an affectionate intimacy and communion of sentiment which made them as one in common fellowship for the common good.

THE PHYSICIAN AND PROFESSOR.

After a pleasant and industrious studentship, Laennec graduated as doctor of medicine of Paris on the 11th of June, 1804, and starting at once into practice, seems to have made his way rapidly into a first and fairly remunerative position. He was never greedy after practice for the sake of the money which it might bring to him, but he quickly earned as much as he required for his simple tastes and pursuits. His private practice brought him at last about 25,000 francs a year, and to this sum he added for a few years 10,000 francs from the Faculty of Medicine for professorial work, with 5,000 from the College of France, and 4,000 from the Duchesse de Berri : in all, at his prime, about 40,000 francs, or something less than £2,000 of our English money. For this income he worked exceedingly hard, giving away a great deal of his time in gratuitous attention to the poor rather than to the rich ; for when worn out with labour he would forego a call on the profitable patient, but never on one in want who demanded his attendance.

Directly after his graduation Laennec began the work of the Professor by opening up a course of lectures on pathological anatomy, in rivalry with Dupuytren, who was just then nearing the zenith of his fame. In this active part of his young life he

showed the originality of his powers by defining the diseases *Encephaloid* and *Melanosis*, not originally—for they had both been differentiated in this country—but quite originally in so far as he himself was concerned.

Of feeble and delicate constitution, Laennec suffered from overwork within a year or two after he commenced his active practical career, so that he was compelled to give up his pathological course in the year 1806, and from thence onward devoted himself to practice almost exclusively. He does not seem to have taken any prominent part in the politics of the time, but it has been said that he neither relished the vagaries of the Republic nor the brilliant despotism of Napoleon. This is what might be expected, for he was brought up in the old monarchical school, and looked forward to the restoration of the ancient line of kings of France and the revival of the Church. Nevertheless, when, in the ill-fated year of 1814, the pressure of war fell on Paris, and its hospitals were filled with wounded and half-starved soldiers, Laennec was to the front for the rescue. He volunteered his services to the hospital of La Salpêtrière, and shared with the rest of his colleagues the troubles and anxieties, in the practice of medicine, that are wrought by war. A touching anecdote is told by Forbes about Laennec during these sad months, an anecdote which deserves to be retold in all its truthfulness and all its simplicity.

“Among the young soldiers who at that unhappy period crowded the hospitals, overwhelmed at once with bodily fatigue and distress of mind, there happened to be a great number of conscripts from Bretagne, who did not know one word of French, and whose sufferings, in consequence, were greatly and fatally aggravated by nostalgia of the worst description. These poor fellows were speedily congregated in the wards under the charge of Laennec, where they derived as much benefit from the care and kindness of their countryman, and from the delight of being understood and spoken to in their native language, as from the skill with which they were treated.”

THE IMMORTAL DISCOVERER.

Two years later, after the fall of the first Napoleon, and after a certain hope of uncertain peace had come to Paris, Laennec was appointed as full or chief physician to the Necker Hospital. It was here that he made the immortal discovery with which this memoir

was opened, and which threw a new light over the whole field of practical medicine.

So soon as the new discovery was made Laennec devoted two years to unflagging labour in following up the results of his happy revelation in diagnosis. No wonder! Did any man of physic in the whole history of physic ever drop upon such a rich field for research? Never. Possibly no man will ever again find the same mine of learning in an entirely new field. We have to read up the literature of pulmonary and cardiac diseases just before his time, to read the most advanced treatises, in order to obtain even an idea of the newness and fruitfulness of his labour. He roamed for two years in lines of discovery which forced themselves upon him, and which he could not miss had he so desired. The actual slight which his curious little instrument of research received was a fact in his favour, for it left him master of the scene, monarch of all he surveyed. Day by day he was analysing diseases; separating one disease from another; tracing out the courses of diseases that had heretofore been inexplicably mixed; comparing the course of the general symptoms, which were well known, with the purely local or physical, which were utterly unknown; and putting the two classes of symptoms together in their precise relationships.

With labour of this kind, so novel and so absorbing, he was compelled, by the circumstances of the position, to invent a new nomenclature, and in fact a new technical literature. His first attempt of the kind in giving a name to his new instrument of research was as fortunate as it could well be. No term could have been happier in sound, none more expressive, than *στήθος*, the breast; *σκοπέω*, to examine—*Stethoscope*. Hippocrates himself might have invented it, and would at once have understood it. Then followed the naming of sounds, natural and diseased, throughout all the respiratory divisions, and after them the sounds of the heart, internal and external. We hold the literature thus founded, the language thus invented, to the present hour; it is as familiar in our mouths as household words.

In June, 1818, Laennec laid the facts and results of his work before the Academy of Sciences. His memoir was received, the late Dr. Cowan told me, "with respect, but without the slightest trace of enthusiasm." That, at all events, was the account of the matter current at the time. The fact is not remarkable; it is rather in accord with the general sentiment, medical and purely scientific. The method evoked no jealousies, and therefore no enthusiasm. A

Discovery of Mediate Auscultation by Stethoscope 311

toy had been introduced into the healing art, and would do no harm if it could do no service. It was somewhat like the old housewife's opinion of her family adviser :—

“Our doctor is a man of skill ;
If he does you no harm, he does you no ill.”

The stethoscope, therefore, passed into use and into fame with imperceptible step and unmistakable certainty, until at last it literally blazed forth in full splendour. What effect it produced when it did take, let Forbes, who was an eye-witness, relate in his own language.

“His work (the original work of Laennec), *De l'Auscultation Mediate ; ou, Traité du Diagnostic des Maladies des Poumons et du Cœur, fondé principalement sur ce nouveau moyen d'exploration*, was at first received by the profession with considerable distrust ; and the new mode of diagnosis, and especially the instrument, was attempted to be turned into ridicule. Indeed, but for the admirable descriptions of the diseases contained in the work, which proved the vast industry and talent of the author, and rendered his volumes infinitely valuable, whether his diagnosis were true or false, it seems probable that the discovery of Laennec, like that of Avenbrugger, might have been allowed to fall into temporary oblivion. As it was, however, the work soon excited a great sensation in Paris ; and the new method of diagnosis was hailed, especially by the younger members of the profession, as a discovery fraught with the most splendid results. Fortunately the whole of the author's investigation had taken place in the eye of the public, and before numerous and zealous pupils, both able and willing to prosecute the methods which they had seen productive of such wonderful effects in the hands of the Master. These pupils, with a fervour natural to their years, soon spread the practice of auscultation not only in France, but conveyed it, in some degree, into every country of Europe.”

The labour of this overwhelming effort told severely on the health of its author, and indeed for a season laid him so low that it was necessary for him to retire from Paris, in the very midst of his triumph, and seek repose in the district where he was born.

Near to Quimper, on the bay of Douarnenez, he had a country house, which was known by the name of Kerlouaruco, a provincial term meaning a place of foxes ; and it was here that he sought the repose which he had so richly earned. He was, in point of fact, extremely ill. In a communication made to Dr. Forbes, Dr. Meriadec

Laennec stated that the symptoms were dyspnœa, with puerile respiration, without cough; dyspepsia and anorexia, but without redness of tongue; nausea, vomiting, diarrhœa, and pain in the abdomen; a tendency to vertigo, but without headache; great muscular debility, with disposition to fainting; and lowness of spirits, amounting almost to *tedium vitæ*; the two last-named symptoms being the most distressing of all.

The effect of the native air, the change of scene, and the outdoor sport, including hunting, to which he was much devoted, had an influence for good on Laennec which was magical in its results. He soon recovered his good spirits, he regained flesh, and the chest symptoms quickly abated. The improvement was so great that he hesitated whether he ought ever to return to Paris, and his inclination was entirely against such return. But a sense of duty, amounting to obligation, caused him to run every risk and go back to his post. He feared he might not survive even so long as six months, yet still he must resume his labour in the completion of his work, and to the best of his ability leave it perfect for the future. This was but fair to the profession and to humanity. He returned to Paris and to his professional labour on November 15th in the year 1821.

Laennec was at the time named forty years of age, and his duties were resumed with all the ardour of his willing nature. They were not curtailed by his enforced absence from them; on the contrary, they increased as his fame had done, and as the new practice which he had instituted bore the test of experience from others as well as himself. Many pupils were waiting to receive his instructions in the art of diagnosis by mediate auscultation; and soon a clinical class, which he was obliged to form, was crowded with students from all parts of Europe. His great book on the subject of his clinical teaching had also to be extended; and the little instrument, the stethoscope, had to be modified in various ways before it met with its final shape according to his full approbation.

It may be worth the rest of a moment in this place to refer to the development of the stethoscope. We have seen already that the first instrument was improvised from a roll of paper, which for a short period answered fairly; but soon a more durable instrument was turned in wood in the form of a straight cylinder one inch and a third in diameter, and twelve inches long, with a bore of the third of an inch extending quite through it. The tube was divided into two parts in the centre, transversely, so that it could be taken into two

pieces if necessary ; and at its lower part—that which was applied to the chest—it was armed with what was called a stopper, which could be taken out or fixed in by means of a short connecting bit of brass tube. Forbes had in his possession one of these “second edition stethoscopes,” that had been sent to him by Laennec himself a short time before his death, an instrument which I remember seeing at Forbes’ house when once visiting him there, in company with the late Dr. Patrick Stewart and Sir John Rose Cormack. Forbes used this stethoscope for many years in preference to any other, although towards the end of his active life he retained it rather as a curious relic than as an instrument for daily practice.

The stethoscope in a more advanced stage assumed a more finished, or third, development ; and this was the instrument that first found its way into England. It was imported from Paris in 1820 by Trentell & Wurtz, booksellers, in Soho Square, at the price of two francs ; and when the demand for it exceeded the supply from abroad, it was manufactured by a wood-turner named Allnutt, who lived in Piccadilly. One of the stethoscopes made at this stage—or rather part of one, for a section of it is lost—was given to me by Dr. Willis, of Barnes, in exchange for another with a jointed ear-piece, which I had invented, for the convenience of the pocket, and which he very much liked. I have this third-edition instrument still in my possession, have had it in daily service for about thirty-eight years, and a better instrument I could never wish to use. It is seven inches and a half long, has a half-inch bore, a bell-shaped mouth a little more than an inch in diameter, and is surmounted by an ivory ear-piece two inches and a quarter in diameter.

To return to Laennec. On recommencing practice he was appointed by Dr. Hallé, physician to the Duchesse de Berri, as his successor in that very responsible and not very lucrative post, for which he received four thousand francs per annum ; and on July 31st, 1822, he succeeded Hallé in another and much more dignified position, as Professor in the chair of medicine in the College of France. He commenced his professorial duties on the 2nd of December of the same year.

Some political disturbances which arose in the Faculty of Medicine caused that department to be closed by royal decree for some months ; and when it was reopened, in February 1823, Laennec was elected to fill the chair of clinical medicine at La Charité. He had been offered to be made a member of the Royal Council of Public Instruction, but he preferred to continue at his clinical labours, by

which he was still to advance the new art of diagnosis he had founded, and to revise the book that was to carry his name down to posterity.

THE VICTIM OF LABOUR.

Busily engaged in his many and distinguished pursuits—acting as the consultant in a practice which rapidly increased, although cut down by careful selection to the lowest possible working form—teaching several hours each day his new methods of diagnosis, and in the act and art of teaching learning also and correcting past mistakes or misunderstandings of nature—revising and republishing a fresh edition of the work on auscultation, with additions on the subject of treatment—the feeble body of Laennec again proved incompetent to bear the mental strain to which it was subjected. The book was finished, and so was its author, in as far as active labour of mind was concerned. A dry, hard cough, which came on insidiously, increased, and in the course of the year 1826 grew so serious as to compel a return to Brittany and native air. As early as April the disease was making rapid progress. He was subject to febrile paroxysms and loss of flesh; and, in addition, he had pain in the right side and diarrhœa. In accordance with the prevailing practice of the time, he was bled, and otherwise treated as one who required strict antiphlogistic measures. Of course this treatment was of no avail, and, not to be too severe upon it, had better have been omitted; for, in plain matter of fact, the man was now fatally stricken with the very malady—*Phthisis pulmonalis*—which he, by his own consummate skill, had done so much to elucidate.

As the last resource Laennec must resignedly lay all his honours and useful labours by, and go home in every sense of that expressive term. Unfortunately, on his journey to Quimper he was unduly delayed, and in the course of the journey met with an accident which shook him considerably and aggravated his malady. For a little while, nevertheless, he was revived by the change; and, by the bright sea air with its friendly surroundings, was made comparatively happy, if not hopeful or ambitious of life. The relief was merely temporary: his symptoms became daily more and more severe, and on August 13th, 1826, in the forty-sixth year of his age, he breathed his last breath, and was buried in his native place.

He died childless, although two years before his death he had married. His widow, Madame Laennec, received from the State a

pension of three thousand francs per annum. She lived until the year 1838.

Forbes, whose excellent memoir is the oldest after that of Bayle, and perhaps the best that has been written on Laennec, is careful to relate that the cause of the death of the discoverer of the stethoscope was consumption of the lungs; and he adds that it is somewhat curious that he shared the fate of some of his most illustrious predecessors in falling a victim to a disease the nature of which he had taken particular pains to describe. Lancisi and Corvisart died of diseased heart; and his own friend Bayle sank, like himself, under the ravages of the disease of which he had been the most successful illustrator. M. Laennec's case presented all the external symptoms of consumption; and its nature was, moreover, fully confirmed by the very art which he had himself discovered. Before he left Paris Doctors Recamier and Meriadec Laennec discovered imperfect but evident pectoriloquism under the clavicle and in the supra-spinal fossa of the left side; and, at Quimper, Doctors Ambrose Laennec and Olivry observed the same in the infra-spinal fossa. Some time before his death his medical attendants had likewise discovered a hard, irregular tumour in the abdomen, the precise nature of which was never ascertained, as the body, owing to the absence of any competent operator, was not subjected to examination after death.

THE MAN PERSONALLY.

The personal character of the discoverer of the stethoscope, as described by the best authorities and from his immediate contemporaries, is singularly impressive and beautiful. "He was of diminutive size from birth, but not a sufferer from disease in the earlier parts of his life. He grew up small in stature and very thin, but of greater muscular powers than his figure promised." He was extremely fond of field sports, and took great delight in speaking of them. The exertions he was capable of making on these occasions were remarkable, considering, as he said, "*l'air chétif de son extérieur.*" For instance, he could walk eight or ten leagues, carrying his bag and gun, and on his return home, in place of resting himself, could enter into some species of domestic amusement. "During the latter part of his life he was attenuated in the most remarkable degree, insomuch that it was a matter of astonishment to every stranger that he could undergo the exertions which his duties required. He was a man of the greatest probity, and

habitually observant of his religious and social duties. He was a sincere Christian and a good Catholic, adhering to his religion and his Church through good and bad report. His death, according to Bayle, was that of a Christian. Supported by the hope of a better life, prepared by the constant practice of virtue, he saw his end approach with composure and resignation. His religious principles, imbibed with his earliest knowledge, were strengthened by the conviction of his maturer reason. He took no pains to conceal them when they were disadvantageous to his worldly interests; and he made no boast of them when their avowal might have been a title to favour and advancement. He was mild and agreeable in his manners, and of a quiet and even temper. His conversation was at once lively and instructive, and his natural humility and kindness of heart were in no degree lessened by his great reputation and the deference that was paid to him in the latter part of his life. He was remarkable for his great kindness and courtesy to foreigners, particularly the English. He was, however, less popular with many of his own countrymen, and especially with that numerous class of students and young practitioners who were disciples of the school of Broussais. With Broussais Laennec was much at variance, and a controversy was kept up for some time between them which redounded little to the credit of either. For Laennec was not free from prejudices, and he could never be brought to render full justice to the doctrine of his opponent."

Such is the testimony borne by the cotemporaries of Laennec to his memory, to his virtues, to his failings. It must be admitted that his virtues far outbalance his failings, and it may not unjustly be said of his failings themselves that they leaned to virtue's side. His worst fault of all seems to be that he opposed the school of Broussais; and now that the excitement and enthusiasm which surrounded that school have passed away, now that the glamour has faded, and we are able to look on the hypothetical follies of that school calmly, we may forgive Laennec a great deal—perhaps, willingly, all. He saw the follies; we have only read of them: a marked difference. More than that, he had anticipated some things that were really good in the system; and in regard to what he thought the best, as founded on direct observation from nature, he was not recognised. But the most cogent cause of dispute lay in the primary difference of nature of the two men themselves. Laennec was a simple observer, sensibly acute in respect to all that came before him, diligent in recording, and industriously slow in

Discovery of Mediate Auscultation by Stethoscope 317

collating that which he had recorded. He had never occasion to go seriously back in his record; and yet, with true and simple honesty, he was ready at every moment to revise whatever appeared to him to demand revision. Broussais, on the other hand, was of imaginative disposition; fretful under labour, while yet a severe labourer; hopeful beyond the natural confines of hope, and angry if, at any time, a cherished doctrine or expectation did not respond to the desire which was its true and devoted parent.

In a great many points of view Laennec resembles closely our own Harvey. He must have been something like Harvey in figure; but he was more like him in mind. Both were devoted to classical learning; both were accumulators of rich stores of original facts from nature; both left behind them incomplete treasures of industry. But the point of resemblance that is most striking, and, indeed, too striking to be passed by, is the similarity of power of observation with which they seized hold of what to others were mere trivial incidents, and turned the same into instant practical account on matters previously slumbering, and which, once awakened, gave a new voice and character to the whole of the future of science. How truly trifling a circumstance may be the vital circumstance which such men disclose, from what, to men unendowed with the finer faculty, are mere passing incidents! If Harvey had never been shown the valves in the veins, how long might not the circulation of the blood have remained concealed! If no patient had appeared before Laennec to whose chest he could not put his ear, nay, if the roll of paper of which he speaks had not been at hand, how long, even with Laennec in the flesh, might not the stethoscope have been kept from the light, and the physical diagnosis of disease of the chest been an unknown art? The art began with Hippocrates, and slumbered for ages. What millions of physicians must have attended millions upon millions of cases of chest disease between Hippocrates and Laennec—physicians learned as Galen, wise as Sydenham, keen as Morgagni! And yet Laennec was the man and mind wanted to make, or rather complete, a discovery that had been lying ready for birth some thousands of years; and he, for that birth, required a patient of a special kind, and a quire of paper conveniently at hand to roll into a tube. Dr. Walsh, in one of his admirable volumes, reminds us, on the title-page, of an old scholar who went so far as to predict that a day would come when men would listen to the workings of the animal mechanism as they, in that time, listened to the work that was going on in a carpenter's shop; and in due course the

time did arrive. It arrived at last, but not in a hurry, even under the lift it got from the very suggestive prediction. It waited for the fat young lady with heart disease whose chest could not be touched by ears polite, for the quire of paper that admitted of being rolled into a tube for listening through, and for this man Laennec to do the part of thoracic eavesdropper. Then all was clear as day, and people began to go to the doctor to be "sounded," just as naturally as they went before to have their pulses felt, or their tongues looked at, or their blood drawn.

It was a common saying regarding Laennec, by his compeers, that while he was without a rival in diagnosis, he was not a good practitioner—which means that he was not a good practitioner according to their ideas of practice heroic and fearful. To us Laennec would now be a practitioner very heroic, so much so that I doubt if any medical man living would, for the life of him, take some of his prescriptions; but in his own time, when so little was known of the great system of natural cure, he would easily be out of court. It was amply sufficient against him that he had a glimmering of the truth as to the existence of a considerable run of cases of organic disease for which the so-called practice of remedial cure, by drugs, blood-lettings, and other heroic plans could do no good, but was likely to do grievous harm, as much harm as good, to say the least on so debatable a point.

LAENNEC IN LITERATURE.

We have seen Laennec as scholar, physician, and discoverer. We have yet to glance at him as a man of letters. From the earliest days of his practice he cultivated literature. He had real love for learning, and so classical were his tastes that he was accustomed to carry out his correspondence in the Latin tongue. Forbes gives two letters written in Latin which he received from this master, who was wont to regret his inability to enforce his views that the Latin should be the one common language in daily use amongst the scientific and learned of every country.

At the early age of twenty-one he was an author, his first essay having for its subject a case of disease of the heart. A little later he published another essay, on *Inflammation of the Peritoneum*, which, as a pathological study, was shrewdly in anticipation of the later works of one who became his most formidable rival, the famous Broussais. He wrote also a review of the French edition of the great work of Benjamin Bell on the venereal disease.

Discovery of Mediate Auscultation by Stethoscope 319

His earlier additions to medical literature were communicated to the *Journal de Medicine* while it was under the editorship of Corvisart, Leroux, and Boyer; and in 1804 he was himself appointed editor of this journal, a post which he held for six years with credit to himself and advantage to the profession. Amongst other essays in his early days which attracted the notice and admiration of his seniors was his graduation thesis on the doctrine of Hippocrates applied to practical medicine. Bayle was much impressed by the knowledge which the new graduate displayed of the ancient Greek science of medicine. The criticism was sound, for with the works of the father of the healing art Laennec was so familiar that, as he himself admitted, he derived the discovery of mediate auscultation from them.

In 1827 F. G. Boisseau enumerated the minor works of Laennec in the following order:—

“*A Treatise on Peritonitis, in the Journal of Medicine of MM. Corvisart, Leroux, and Boyer, 1802-3.*”

“*A Treatise containing the Description of the Membrane Proper of the Liver. Ibid., 1803-4.*”

“*Description of an Anatomical Process by the aid of which the Internal Membrane of the Ventricles of the Brain can be Dissected, of which the Anatomists admitted the Existence by Analogy, but without having demonstrated it with the Scalpel. Ibid., 1804.*”

“*A Treatise on Pathological Anatomy. Ibid., 1804.*”

“*Monograph on Vesicular Worms, containing the Description of several New Species, and of the Diseases and Organic Changes to which the Presence of these Worms gives rise in the Human Body. Paris, 1805.*”

“*A Treatise on the Melanoses, a Kind of Accidental Productions, confounded until then with Cancers. Bulletin of the Society of the Faculty of Medicine, 1806.*”

“*Essay on Angina of the Chest, 1806.*”

“Essay to prove, by observations and anatomical researches, that the affection described under this name by several Scotch and Genevese physicians cannot be attributed, as several amongst them had thought, to the ossification of the coronary arteries of the heart, and that it often exists without any organic change.”

“*A Treatise on a New Species of Hernia.*”

“In the Archives of the Royal Academy of Medicine, this treatise was printed on account of the translation by M. Cayot of the Treatise on Hernia, by M. Scarpa.”

"In the Dictionary of the Medical Sciences there are also some papers by Laennec on *Pathological Anatomy, Hydatids, and Encéphaloides*."

In addition to the works above cited by one of his cotemporaries, Laennec contributed essays on *Suicide*, on *Diseases of the Heart*, and on *Hydrocephalus*, in the *Journal of Medicine*, as well as an article on the *Brunonian System of Medicine* and on the *Works and Doctrines of Gall*. Concerning the ideas of Brown, which I have commented on in his life, Laennec entertained the most just views. He considered the remarkable Scotchman to have been a man of true genius, who, if he had interrogated Nature instead of commenting on her ways without investigation, would have discovered many of her secrets and added largely to the solid learning of medical art. Of Gall's system he was less appreciative and more critical, telling a capital story of the first Vestris, the dancer, who, on being asked, after one of his dancing feats, if he were not tired, replied, "Monsieur, dans notre art la fatigue des jambes est peu de chose; c'est ceci qui travaille," pointing to his head. "Why, then, does not Gall," asks Laennec, "give a bump for dancing, as he does for painting?"

After all, the grand reputation of Laennec must rest on his one immortal work, and on his own special discoveries. It is not too much to say that any man of good intelligence could have written the other memoirs. No one less than a Laennec could have written the treatise on *Mediate Auscultation and the Use of the Stethoscope*. The true student of medicine, who never wears out, reads this original work of Laennec once in two years, at least so long as he is engaged in practice, and takes a living interest in the subject of which it treats. He keeps up in this manner a knowledge of principles and foundations. He continues to remember the origins of terms and names. He lives with origins, with original thoughts and events, by which his own original powers of observation are nourished, directed, and sustained. Sometimes he meets with natural mistakes, as where the great discoverer thinks and teaches that the first sound of the heart is caused by the contraction of the ventricles of the heart, and the second sound by the contraction of the auricles. Yet, every such fault admitted, the work as a marvel of genius, research, and industry is one of the few best of best, of which ten at most make up the whole. It ranks equally with the original works of Vesalius, Harvey, and Bichat, and, as a section of medical literature, is quite equal to any section of Hippocrates. It

is a book of pathology as well as of diagnosis; and if the matter of treatment be its weakest part, even that was far in advance of its time.

Medical France may well be proud of Laennec, and we English, of whom he was so fond, ought to share in the exultation. I fear, however, that Frenchmen themselves are not sufficiently alive to the immortal deserts of this one of their immortal countrymen. In Paris, I have often asked intelligent Frenchmen:—Where is the grand monument to Laennec, where the grand boulevard that is honoured by his illustrious name? And the only answer I have ever received has been that shrug of the shoulders with which the dearest fellows of France always tell us Islanders: “Je ne sais pas.” Were I a rich Frenchman, or even a rich Englishman, they should soon know all about it!

William Hunter, M.D., F.R.S., F.S.A.

ABOUT one hundred and thirty years ago there might be seen driving through the fashionable parts of London in a plain and, to the modern taste, cumbersome chariot, a light, spare, short man, whom many persons know and whom all recognise with respect. The features of the man are of Scottish cast, but pleasant and winning. There is an intelligence in the face which bespeaks acuteness rather than power, and caution rather than courage. The external of the man is perfect for the time. The head is surmounted with a wig, unpretentious in size, and well suited to the features beneath. The body is clothed in a dark suit, with coat and waistcoat collarless, and shirt-front gently protruding from vest in elegant frill. The chariot starts from the door of a house in Jermyn Street, and, much earlier in the morning than is fashionable now, bears its owner through the great squares and streets, near St. James's and Pall Mall, on medical professional rounds. Whenever the chariot stops the occupant alights, and with quick firm steps proceeds with the work before him. His patients, as they receive him, listen with much attention to his careful teaching; and, professional matters over, get a hasty chat with him on general topics. It is a pleasant moment passed in this way, for the man is not a mere hack, bound hand and foot to the Æsculapian shaft, but a gentleman and a scholar. He can talk about everything, and knows all that is going on. The antiquary brings him an ancient coin, and finds a colleague who can discuss the points of date and of value. The naturalist shows him a fossil bone, and straightway the two are at home and comfortable. The historian discourses with him as a brother; and with the classic he crosses excellent Latin. With the ladies his conversation is charming, for his voice is musical, his expression faultless, and his manner gallant. With them he has but one blemish, and even that may be curable: he is a bachelor, and pretends, with all his vivacity, to invincibility against female charms.



William Hunter

Portrait by R. E. Pine, engraved for Pettigrew by J. Thomson.



The sick visits are concluded, but the chariot still wends its way, until at last it stops in Covent Garden, where the scene changes. There is held at this time in Covent Garden a society or lecture-place, in which young men who are about to seek their fortunes in the Naval Medical Service meet to train themselves to the duties before them. They take their seats on the benches, the carefully dissected subject is placed on the lecture table, and the active little personage who has attended us so far enters the room and takes the professorial position. There is a suppressed but hearty cheer; and then the lecturer, the natural manuscript, only, before him, commences his lesson. The eloquence, the precision, the force, hold back an applause which is ready at any moment to pour forth, and when the last words are uttered does pour forth in free course. The lecturer smilingly retires, the students stop behind to talk in admiration of their teacher; and the teacher himself, but little wearied, glides again softly to the chariot. He will call at Middlesex Hospital, perchance, or at the British Lying-in Institution, to perform his public duties there, and then he will return to Jermyn Street to dine with his friends.

If you are invited to the dinner, you will find everything about the house substantial and in taste, but plain withal and inexpensive. Whatever may be the host's income, it is clear that he does not expend it on externals. The dinner, too, is a pure feast of reason. You may meet Fothergill, and young Hewson, and Watson, and one or two of the literary men of the day, and you may be entertained at a mental banquet; but the poor body will feel no inspiration from a feast. At most you will see but two dishes; and your host, before grace, will tell you that he makes no apologies, for in his opinion "a man who cannot dine on one dish deserves no dinner." When the table is cleared the servant will go round and give you one glass of wine—not a drop more, though you may sigh as if you would die for it. The conversation will turn on various subjects, and your host will take the lead. He will recount his late visit to Leyden, and his interview with Albinus. He will attack Edinburgh Munro fiercely, for he is grand at invective, or describe some new dissection on which he is engaged. You may hear something of Brother John, who, in indifferent health, is away on a sea-going trip, but who is constantly sending some specimen to Jermyn Street, to announce the fact of life. You may hear too of political rumours, and suggestions as to the results of the court-martial held on the noble Sackville; but town scandal there will be

none, nor much mirth. Tobacco—fie!—who dare smoke in such company?

The conversation flagging, or the time becoming unruly, you will leave the table and be led to the museum. Here the active little man brightens up anew, and, heeding you little as visitors, puts on his work dress and begins to prepare and arrange such specimens as are in disorder. He apologises for the museum. It is in fact but a nucleus; some day he hopes to make it wonderful, to build a great temple of curiosities, and leave all to his country. He will make the Premier an offer, which even a Premier cannot refuse. Then old Calderwood, the village in which he was nurtured, will look up and be a place of mark for ever. You leave the philosopher for the night; but he remains at his work, or, as he calls it, his play. Long after you are in bed he is still at play, injecting lymphatics, or fitting up specimens in spirit bottles. Unless you get up with the sun, too, your friend will be up before you and again at play. At nine you call to leave your card—manners in the last century must be sustained rigidly—and find the chariot at the door, and the little man, as is his wont, spruce and trim, bright, pleasant and intelligent, ready to get into it once more; indeed, his foot is on the step, and he is in haste, for there are a great many demands in the morning on the services of Dr. William Hunter.

William Hunter, at the time I have depicted him, was the rising London Accoucheur, and if getting into good practice is to be considered as fame, he was now approaching the zenith of his fame. He was little over forty years of age, hale in mind as body, full of enthusiasm, and ambitious in the right way. With the centre-point of his life before us, we may take sight of him in two directions—towards his cradle and towards his grave. There is not much historical matter before us for biographical display, but such as exists is trustworthy, and had better be at once acknowledged, since it is half the battle in writing well to write with a clear conscience. Men who steal always go on tiptoe, and that style is not easy. There was, then, one Dr. Samuel Foart Simmons, who, directly after Hunter's death, wrote a memoir of him, which he read to the Society of Physicians on August 6th, 1783. This memoir is as rugged as a pineapple, and much more shapeless; but it has the credit of substantiality, and stands, like the apple, on a broad bottom. In collecting his material, Simmons had the assistance of John Hunter; of Combe, who attended William Hunter to the last; of his relative Mrs. Baillie; and of many other friends; and from this memoir

every other biographer has taken his cue.* I cull largely from Simmons, with fullest recognition.

BIRTH AND EARLY LIFE.

William Hunter was born at Long Calderwood, Kilbride, on May 23rd, 1718. There seems, in regard to this Hunter, no doubt as to the date of birth. He was one of seven sons of his parents, and at the time of his birth their second son. Some years before they had had a first son "John," but he died early, to make way for a second John, the first in fame of his family. There was also another brother, James, who, starting as a Writer to the Signet in Edinburgh, at last took to medicine, and showed great proficiency; but died of lung disease before he had time to become eminent.

William at the age of fourteen went to Glasgow, and studied five years at the University there, with the intention of entering the Church. But when his studies were completed, he declined the mission before him, on conscientious grounds. He could not subscribe to the dogmatical articles of the faith. He was not the first good man who has been driven to Physic by the same cause, for which Physic may thank the Church. His parents, who were poor, and who had spent as much as they were able to prepare him for the pulpit, were disappointed, but prudently gave way to his scruples. In his hesitation what next to do, he became, in some way, acquainted with Dr. Cullen, then in practice at Hamilton, and Dr. Cullen advised him to follow Medicine. He took the advice, and in 1737 he went to reside with Cullen, and lived with him some years. During this residence master and pupil became as one, and in all his life Hunter retained in his remembrance this happy and congenial period. So intimate, indeed, became the friendship, that at last it was agreed that the pupil should have a share in the practice of the master, and should undertake the Surgical department. In November 1740, therefore, Hunter repaired to Edinburgh, to prepare for this responsibility, and remained pursuing his studies until the spring. During the session he attended the anatomy class of Dr. Alexander Monro. In the summer of the same year he entered London to complete his studies, with the object after this of rejoining Dr. Cullen. The return was not made; and it is fair to say that when the master found that the return would spoil the prospects of his disciple, he at once generously excused him the agreement.

* In one biographical work, Simmons' memoir is cribbed word for word, with mention of his name once only, and that not in acknowledgment.

On his entrance into the English metropolis, Hunter took up his residence with Smellie, of obstetric fame, who then resided in Pall Mall. The connection was fortunate for our scholar; but he was yet more fortunate in having a letter of introduction to Dr. James Douglas, from Foulis, a Glasgow printer, to whom Douglas was under some kind of obligation. Douglas was originally from Scotland, and was, in his time, a man of considerable note. It was unfortunate that he had a Quixotic brother (John Douglas), who made himself notorious by attacking Cheselden anonymously. The freaks of John Douglas were often attributed to James, but, in so far as can be gathered, very erroneously. James Douglas was a man of deserved repute, and good-hearted. He had originally adopted anatomy as his calling, but afterwards followed midwifery, a practice just then coming into existence among male practitioners. He was evidently well to do, and at the time when William Hunter came before him he wished for an assistant, and soon fixed upon William as the man to select. He therefore made an offer to that effect, which was gladly accepted, after some temporary obstacles were removed out of the way. To bind himself to London life was for Hunter to break faith with Cullen, and to disappoint parental expectations. Hunter, therefore, wrote to Scotland for liberation from his previous contract. Cullen, as we have seen, gave up his claim; and old Mr. Hunter who, by the way, died three months afterwards—in a very sensible and homely letter, gave a negative assent. William Hunter consequently went to reside with Dr. Douglas, and remained with him till his death on April 1st, 1742.

Whilst living with Dr. Douglas, and working with him, William Hunter entered as a pupil at St. George's Hospital. Here he studied Surgery under Mr. James Wilkie. During the same period he also studied Anatomy under Dr. Frank Nicholls, and Natural Philosophy under Dr. Desaguliers, a famous mathematician and physical philosopher, who ultimately became chaplain to the Prince Frederick. After the death of Dr. Douglas, Hunter continued still to reside with the Douglas family, and we may infer that he ultimately obtained a considerable introduction to practice by this means, and that his connection with Douglas led him to the line of practice to which he afterwards linked himself, the practice of the accoucheur. Meanwhile, he undertook the supervision of the studies of Mr. James Douglas, the son of his late friend.

The first evidence we receive of the originality of mind which in later life showed itself so well in William Hunter, is in 1743, when

he presented to the Royal Society a paper on the structure and diseases of articulating cartilages. At that time medical societies were limited in number, and all matters of scientific interest, medical and general, were sent to the "Royal." The paper of Hunter was, consequently, sent there and read. But it did not immediately secure him his Fellowship, though, if I remember rightly, it was awarded a niche in the *Transactions*. Hunter, having thus made an entrance into public life, was anxious to do more, and his bent was next to teach anatomy. There were immense difficulties in that day to a position the attainment of which is now comparatively easy. But at last the difficulties gave way, and his object was secured. Samuel Sharpe, the Lawrence of his day, had for some time lectured in Covent Garden to a class of students who were preparing themselves for the Naval Service. About 1746, Sharpe, who had said his say, gave up his teaching duties. Hunter succeeded him, and his first course was very satisfactory; his second still better. Walking home after his second introductory lecture, he carried under his arm a bag containing seventy guineas, and his joy was great. Watson, a pupil and afterwards a friend, accompanied Hunter on this occasion, and was told by the delighted lecturer that so large a sum had never been held before by the owner, for first fees are always sweetest, and nothing, as the winner thinks, shows the triumph of effort so clearly as filthy lucre. When Hunter resigned this Lectureship is not very evident; but he held it a long time, and made it a basis of sound success. I have already shown that his labours here were warmly appreciated, and that he was not merely a sound, but a brilliant, teacher.

In 1747 Hunter became a member of the Incorporation of Surgeons, and at the close of his lectures in this year he took a Continental trip with his pupil, Mr. James Douglas. They visited Paris and Leyden among other places, and at Leyden made their bow to the eminent Albinus, who showed them his collection of prepared specimens, and impressed on them a permanent recollection of his industry and genius. Returning to London and to work, Hunter now made rapid way in practice. He was elected Surgeon-Accoucheur to Middlesex Hospital in 1748, and to the British Lying-in Institution in 1749. In 1750, having graduated at Glasgow, he left the Douglas family, took a house to himself in Jermyn Street, and was fairly out on the professional sea, captain of his own vessel, and utilising every favourable gale.

William Hunter, while thus carving his own way to fame, was

helping two others in the same direction. James Hunter, the elder brother, originally intended for the law, had left Edinburgh to study anatomy in London. William had set him to work, and had viewed the work done with a brother's and a teacher's satisfaction. But poor James was not destined for distinction: he was seized with spitting of blood, returned to old Calderwood for native air—and died. There was yet another brother, much younger, John; and John, after sowing a few preliminary wild oats, wrote to William, begging to be inducted by him into the medical fraternity. William said "Yes" to the request; and a few days previous to the eventful 1st of October, 1748, the man who was re-buried with so much pomp in Westminster Abbey thirty years ago rode into London on horseback after a fortnight's journey.

All writers seem agreed in stating that William Hunter did not at first overestimate the abilities of his brother John. This want of estimate was, however, due to deficient knowledge, and to reports that had been made relative to the wild oats aforementioned. John soon undeceived his brother in respect, at least, to talent. He was set to dissection, and at once showed his proficiency. Still John had more oats to sow, and he sowed them. Ambitious in frolic as in science, John, under the title of "Jack Hunter," took the lead in many a wild game: made friends with the resurrection men; visited the sphere of the gods in the theatres to hoot down unfortunate authors and players; and altogether kept up for a long time the principle of "a short life and a merry one" as *the* thing. By-and-by he sobered down to regular work and pursuit of true fame, and became a right hand to his brother in the anatomical duties. The alliance between the two brothers continued for ten years, John Hunter, six years after the commencement of his studies, becoming a partner in the anatomical school. At the end of the ten years John's failing health led him away from this country for six years, and on his return he went into practice on his own account.

In 1751, Dr. Hunter paid a visit to his mother at Long Calderwood. It was their last interview, for Mrs. Hunter died on the 3rd of November of the same year. Cullen had by this time gone to reside in Glasgow, and the meeting of the two old friends was most enthusiastic. One day, riding near Long Calderwood, Cullen observed how conspicuous the place stood out in the landscape. "Well," said Hunter, "if I live I shall make it more conspicuous." It is probable that Hunter never again revisited

his native village. His work in London held him securely for the rest of his life.*

THE ORIGINAL WORKER.

From this period till the period when we first became acquainted with Dr. Hunter, *i.e.* from 1751 to 1758-9, many events of moment, especially in a scientific point of view, occurred. In 1755 he had been made an acting physician to the British Lying-in Hospital, with "the thanks of the Governors for the services he had done the hospital, and for his continuing in it as one of the Physicians." In 1756 (Sept. 30) he had become a Licentiate of the Royal College of Physicians, and a member of the Society of Physicians. He had taught in his class many subjects which, ranking as discoveries, gave rise a little later to violent controversies. He had described aneurismal tumours more carefully than any previous author, and had pointed out the nature of aneurismal varix. He had explained with much care and precision the structure of cellular tissue. He had written an account of the ovarian dropsy, and many questions relating to it—whether or not it should be treated by incision and suppuration, or by complete excision. He had virtually discovered the disease known as retroversion of the uterus. He had introduced bristles into the ducts of the lachrymal gland. He had made out, and taught publicly, the origin and uses of the lymphatic vessels; he had injected the tubuli testis with mercury. He had supported the theory of Haller as to the insensibility of tendons; and, aided by

* Advertisement from the *London Evening Post*, January 12th, 1748.

On Monday the 1st of February, at Five in the Afternoon,

WILL BEGIN

A COURSE of ANATOMICAL LECTURES. To which will be added, the Operations of SURGERY, with the Application of BANDAGES,

BY WILLIAM HUNTER, SURGEON.

Gentlemen may have an Opportunity of learning the Art of Dissecting, during the whole Winter Season, in the same Manner as at Paris.

Printed Proposals to be deliver'd at Mr. Millar's, Bookfeller, opposite to the End of Katharine-Street in the Strand.

The same paper contains an announcement of the publication of *Roderick Random*, and of Hogarth's *Two Apprentices*. Many years ago I was indebted to my learned friend Mr. Charles Hawkins for a loan of this paper.

his brother John, he had made experiments relating to absorption by the veins.

Among all these labours, that of most interest was the one referring to the lymphatic vessels. Previous to Dr. Hunter's time, the theory held by anatomists was that the lymphatics were veins, and that they were the continuations of lymphatic arteries. He claimed to be the first man who demonstrated that the lymphatics have an independent origin, and perform what has been designated "interstitial absorption." He was led to this view by the observation that the lymphatics could not be injected from the arteries, and by a comparison of the lymphatic with the lacteal system. He concluded that there was no virtual difference between these two systems, and that the lacteals were, in fact, the lymphatics of the intestinal canal.

Arrived now at the period at which we first saw Hunter, as he appeared at the zenith of his life and of his fame, let us follow him onwards to the end. In 1762 he was called, in consultation, to the Queen, who was then *enceinte*. His work being now more than he could perform single-handed, and his brothers being away, he needed assistance, and engaged his pupil, the distinguished Hewson, to take part in his labours. Hewson, so well known to us through the pen of his learned and philosophical biographer, the late George Gulliver, was a man in every way suited to the tasks required. He was an excellent anatomist, an ingenious experimentalist, and of gentle and engaging manners; and he soon rose from the position of an assistant to a partnership in the anatomical department.

In this year (1762) Hunter commenced the publication of his *Commentaries*, in which he entered into a controversy with Professor Monro as to the discovery of the origin of the lymphatic vessels, the injection of the testicle with mercury, and venous absorption. He also defended himself from a reproach which had been cast on him by Monro, senior, regarding a dispute which had arisen between himself and Pott in relation to congenital hernia. Pott replied to this, and Hunter again took up the defence, in a supplement to the first series of the *Commentaries*. It is clear on perusing these sallies that the credit which Hunter most desired to secure for himself had reference to the discovery of the origin of the lymphatic vessels. Following Dr. Simmons' statement, which seems to be very fairly and clearly set forth, it would seem that Hunter proclaimed his discovery of the origin of the lymphatic vessels so early as 1746, while Monro, who made similar observations, did not put his views before the world until the year 1755. As regards

Monro, therefore, Hunter has an undoubted priority of claim. But Simmons very properly points out that neither claimant had strict right to the discovery, inasmuch as M. Noguez, a French anatomist, in the second edition of a work entitled *L'Anatomie du Corps de l'Homme en abrégé*, published in 1726, described the independent origin of the lymphatic vessels, and their absorbent use. Hunter's description was given, however, independently, and with more clearness.

THE FOUNDER OF A MUSEUM.

About the time to which I now refer Hunter was contemplating a design which has added substantiality to his fame, and a monument worthier than any that may be raised to him. His circumstances becoming good, he determined first to acquire such a competency as should make him comfortable in his later life, and having achieved this, to found some institution which should be at once his and his country's pride. It occurred to him that the foundation of an anatomical school in London was a desideratum; and with this object before him, he presented to the Minister Grenville, in 1765, a memorial requesting the gift of a piece of ground in the "Mews" for the site of an anatomical theatre. In return for this small grant, he undertook himself to expend seven thousand pounds on the building, and to endow a professorship of Anatomy in perpetuity. Unfortunately, the noble and yet modest request was not complied with, and the scheme as a national project was set aside. Looking back at all the struggles which teachers of Anatomy have endured since Hunter's time, the misfortune of this failure is seen in all its fulness. Had the scheme been followed, there might at this time have existed in London an Academy of Medicine second to none in the world, and the name of Grenville might have stood, in perpetuity, co-equal with that of Hunter. But it is the misery of great politicians to be content with present greatness, to look down with princely smiles on all enthusiasts who live in the future, and, worse than all, even to ignore science, as something apart from any ministerial project. Shall we blame Grenville the Minister? No! He knew no better, and so it were wisest rather to pity the Minister than criticise the man. The Grenvilles are a race well stocked. We have them now, grand and blind as heretofore. Make a similar offer, deluded enthusiast in science of to-day, and where is your Minister that will not smile and decline as Grenville did? A one-minded race these

Ministers, bound to the generation in which they are born ; princes in it, and infinitesimal dust, corporeal and mental, out of it.

Not long after the time when Hunter laid his modest memorial before the Minister, he had a conversation with the Earl of Shelburne on the subject of the school. The Earl approved, but thought the scheme should be carried out by means of a subscription, and requested to have his name set down for a thousand guineas. Generous as an offer, thought William Hunter, but not in taste. At any rate, he, William, would have nothing to do with it. If anything were to be done, he would do it himself ; so he bought a piece of ground in Great Windmill Street, where he built a spacious house, a good anatomical theatre, and one grand room for a museum. This building remained standing until a few years ago, when it was destroyed during improvements carried out by the Metropolitan Board of Works.

In 1765 Dr. Hunter was appointed Physician Extraordinary to Her Majesty, and in 1767 he was elected a Fellow of the Royal Society. His brother John was now back in London, and was becoming a great man on his own account. The brothers, indeed, did not enter again into alliance after John's return, and it is not certain that they were on the most intimate terms. In some respects John was at this time ahead of William in fame, and even received the F.R.S. a short time before him.

After his election to the Royal Society, Dr. Hunter sent to the Society a paper on some bones which had been found near the river Ohio in America, and which were supposed to be the bones of an elephant. Hunter came to the conclusion that the bones were not those of an animal identical with the elephant met with in Asia and Africa. The question thus opened was one of immense general interest at the time ; for a point was then under consideration which has since and lately been before the public—viz., whether animals change and adapt themselves to climate, or whether in the history of our planet such great revolutions have occurred that parts which are now cold and uninhabitable have once been warm and fruitful. In the same year he also described, at the Royal, an Indian animal called the Nyl-Ghau. In the next year he was elected a Fellow of the Society of Antiquaries, and first Professor of Anatomy in the Royal Academy. The latter appointment was made by the King, and the manner in which the duties were performed showed at once that an anatomist may be a chief of artists though he never touch the pencil.

The partnership entered into between Hunter and Hewson continued for many years without interruption; but in 1770 some disputes arose, and the partnership was dissolved. If I may offer an opinion, I should say that the disputes were due mainly to Hunter himself, who being, with all his good qualities, opposed to rivalry, got jealous of his friend. On breaking partnership with Hunter, Hewson entered into a new partnership of a more pleasant kind—*i.e.*, he married a very amiable lady. But he did not live long; four years later, poor man, he threw off the shackles, his last moments embittered by the thought that he was leaving a wife and three children to the mercy of the world.

Cruikshank succeeded Hewson in the Hunterian school, and continued in office to the end. Hunter himself was by this time somewhat worse for wear; he was plagued with fits of gout, and became in 1772-3 so unwell that he had serious thoughts of retiring from practice. Cullen and Baillie, indeed, went to work to find out an estate where he might settle down and rest in peace. They found a suitable spot near Alloa, in Scotland, bid for it, and, as it was believed, purchased it. But the title-deeds being defective, the purchase was never completed, and the design of retirement was altogether abandoned. The museum, the anatomical teaching, and practice, filled up now the whole of Hunter's time, so that literature owes less to him than it otherwise might have done. But his pen was not altogether idle, and when it worked it worked in earnest. In 1775 he forwarded a paper to the Royal Society on the Venereal Disease. The essay was historical. Those who are conversant with Astruc's great work on the Venereal Disease will remember that this author traces the introduction of the disease into Europe from the date of the first voyage of Columbus. His argument runs that the disease was endemic in Hispaniola and on parts of the American continent, that it was communicated to the men who attended Columbus by the Indian women, and brought by these men to Europe; was propagated by them, first to the Neapolitans, thence to the French, and from all three to the other European nations. The evidence on which this argument is founded is taken mainly from the statements of Gonsalvo Ferdinand ab Oviedo, who, being at the court of Spain in 1493, when Christopher Columbus returned from his first immortal voyage, was sent by King Ferdinand to Hispaniola in 1513 to inspect the melting of gold there; and who, living in the West Indies twelve years, and retiring to Toledo in 1525, wrote, at the request of Charles V. of Spain, a *Summary of*

the Natural and General History of the West Indies, in which he assumes that the venereal disease was imported from the newly discovered islands into Spain. Hunter supported the idea that the venereal disease had existed in Europe before Columbus sailed from Palos; he adduced as his testimony the writings of Peter Martyr, a friend of Columbus, author of the *Discovery of America*, and writer of letters on the subject of the disease to Arias Luritanas of Salamanca in 1489; but he did not publish this paper, some doubts having arisen in his mind as to the correctness of the dates of the letters of Peter Martyr.

MAGNUM OPUS.

In 1778 Hunter rendered a memorable service to medical science by the publication of his famous treatise on the gravid uterus. It is almost impossible to compute, in the present day, the influence of this book. For patient research it is a model of excellence. Harvey spent eight years in investigating the phenomena of the circulation. William Hunter spent thirty years in investigating the facts connected with the uterus during the period of pregnancy. We read the work now with all the pleasure arising from the knowledge that the delineations are by and from the pure nature. In the preface due mention is made of the labours of brother John and the artist Strange. In the dedication a compliment is couched to the King. In the body of the work there are excellent plates, excellent readings, the record of the discovery of retroversion of the uterus, and the account of the existence of the *membrana decidua reflexa*. There was, perhaps, never a book published by any one physician on which longer and severer labour was bestowed.

Two years later he sent to the Royal Society an account of Dr. Mary's illness, the report of which is given in the *Transactions*; and in 1788 he communicated to the Society of Physicians an essay on the proposed operation of the division of the symphysis pubis in some cases of difficult parturition. He did not in this contribution directly oppose the operation, but claimed for it a fair trial; his mind was, however, convinced of its doubtful utility and its possible dangers.

A GREAT CONTROVERSY.

From the period of 1777 we meet with no incident of moment until 1780, when one of the most curious and painful of events

occurred—viz., a literary battle between the two brothers, William and John Hunter. There had long been an estrangement between them; and although in 1768, when John was a competitor for the office of Surgeon to St. George's Hospital, he succeeded, mainly through the interest of his brother, the breach was never thoroughly made up. In this year, 1780, John took a step which is as incomprehensible to the world of science now as it was then. He sent to the Royal Society a paper in which he claimed the credit of having first discovered the true mode of connexion between the uterus and the placenta. For twenty-five years all the merit of this discovery had been awarded to William, and John had held a silent tongue—had, in plain fact, by negation admitted his brother's originality. Now he put forward the following statement: that Dr. Mackenzie, having in 1755 injected a subject, and being unable in dissecting it to explain an appearance in regard to the placenta and uterus, he sent for him (John Hunter), who, examining the parts with more care, made the discovery of the true mode of connexion between the two structures. "In the evening of the same day," he continues, "full of the discovery, I came to Dr. Hunter, and brought with me Dr. Mackenzie, to see and judge of the explanation I had given and Dr. Mackenzie had agreed to." William Hunter, on his part, wrote that he had always recognised the labours of his brother John with pride, but that the discovery in question was unhesitatingly his own; that it was not a discovery arising from random conjecture, or lucky thought, or accidental occasion, but from a persevering pursuit of twelve or thirteen years at least, always publicly known, and admitting of the most circumstantial proof. Two angry letters to the Royal Society, which were not published, one from each brother, closed this controversy; but William never withdrew his claim nor fully forgave, while John was made unhappy by the event his life throughout.

It is curious that there are no clear historical documents throwing light on the true nature of this transaction. Like the *Letters of Junius* and *The Man in the Iron Mask*, the event has given rise to much theorising and noise. The only one who could have said something in point was Mackenzie, and Mackenzie is not on the field and is not to be heard: he was dead or silent. Taking all things into consideration, I am forced to the conclusion that the right in this matter rested with William Hunter. The discovery was not one, as William Hunter well observed, that could have occurred on "an accidental occasion"; it was a discovery requiring,

as all such discoveries do require, years of research and repeated observation. That in John Hunter's story there is a nucleus of truth, we can conceive. It may be that he, John Hunter, together with Dr. Mackenzie, did at one time show an injected specimen to William Hunter as exhibiting peculiarities which admitted of being explained in a certain way, and that William laid by the fact, with others similar in kind, but only as one of many from which his larger deductions were drawn : this may be fairly allowed, and, indeed, is virtually allowed by William Hunter himself ; but the claim for him is the importance of the whole discovery, notwithstanding the ambition of a brother, who owed so much to his fostering care, in raking up an unworthy quarrel in order to institute a claim which he had for twenty-five years disclaimed by absolute silence.

It was some recompense to our Hunter that in the year when this dispute was most furious, the Royal Medical Society of Paris elected him one of their foreign Associates, and that the Society of Physicians elected him unanimously in 1781 to preside over meetings to which Fothergill had hitherto supplied the honour of a dignified presidency.

A close friendship had long existed between Hunter and the honoured Fothergill. Fothergill, also a collector of rarities, had established a museum of great value. That it might pass into safe hands, he bequeathed that William Hunter should have the offer of purchase at £500 below the real estimate. On Fothergill's death, therefore, the museum passed to Hunter for £1200, and the Hunterian Museum stood out the wonder of scientific London, and of the scientific world. New honours fall in now ; in 1782, the Royal Academy of Sciences of Paris make William Hunter a member of their body.

The fame of the Hunterian collection spread far and wide. Whoever should visit London must needs see it as one of the curiosities. Every facility was given, too, for everybody to see and learn. There is "the most magnificent treasure of Greek and Latin books that has been accumulated since the days of Mead," wrote Dr. Harwood, while a cabinet of ancient medals added to the richness of the collection. A history of certain of these coins, struck by the free Greek cities, was published by Mr. Combe in 1783, with a dedication by Dr. Hunter to the Queen. The preface of this book contains a history of the museum and the expenses to which the founder was subjected—£20,000.

The museum thus collected by William Hunter exists still, and is one of the chief objects of interest in the city near which he was born, Glasgow. By his will, the use of the museum, under the direction of trustees, was left to his nephew, Dr. Matthew Baillie, and in the event of his death to Mr. Cruikshank for twenty years. After that time, it was bequeathed to the University of Glasgow. The Trustees were Dr. George Fordyce, Dr. David Pitcairne, and Mr. Charles Combe, to each of whom was also bequeathed an annuity of twenty pounds for thirty years.* The sum of eight thousand pounds sterling was left as a fund for the support and augmentation of the collection. Dr. Baillie, on his part, soon allowed the transmission of the collection to the good old city; and there, in the College grounds, and in rather a noble building, the great treasures are now preserved, memorable honours to all Scottish students, so long as Scotland retains her nationality.

To describe this remarkable museum would be an impossible task in a memoir like the present. Whether we turn to the art department, to the books, to the coins, to the natural history, or to the anatomy, there is to be discovered treasure upon treasure. For my part, I hardly consider I have been to Glasgow if when there I am not able to get to this place of fascination, and, under the kind and learned guidance of Mr. Young, the curator of the museum—I wish William Hunter could have known Mr. Young—pick up something new that shall become a constant recollection. In art there is a portrait of Harvey, by Van Bommel, showing the great anatomist in his old age, with pens and paper before him, and a pillar or monument of fame in the background; a portrait of the sister of Hunter, who married the Rev. James Baillie, and became the mother of Joanna and of Matthew Baillie; and the head of St. Peter, by Rubens. Among books, we find eleven, or as some reckon thirteen, Caxtons; the Aldine Plato, entire and almost stainless, printed on vellum; Tyndale's New Testament, corrected by himself the year he suffered martyrdom (1536); three hundred volumes of Bibles left by Ewing; and the Anatomy of Mondinus. Above all, to the medical scholar is the anatomical collection specially interesting, not because of the number of specimens, but of the rarity of those that are to be found. There is one injected

* Dr. Hunter left an annuity of £100 to his sister, Mrs. Baillie, and £2000 to each of her two daughters. The residue he left to Dr. Baillie. Brother John had not even a ring. Baillie afterwards made over to John Hunter the family estate.

specimen which alone is worth going to see: the face of a child which has been divided into its two lateral halves, that the section of the brain may be exposed, but in which the features are so wonderfully preserved, that after a hundred and forty years the face seems still to live; in the brain the *medulla oblongata* is also more perfectly exhibited than, perhaps, in any other specimen anywhere extant. But I must really stop in description.

We arrive now at the commencement of the year 1783. By this time our constant labourer in the scientific field is failing in physical health. Notwithstanding his simple mode of life and active pursuits, he is a constant martyr to gout. Yet he keeps at his work, "as eager," says Simmons, "to acquire new credit, and to secure the advantage of what he had gained, as he could have been at the most enterprising part of his life." He engaged himself, until the very period of his last illness, in preparing various papers. One important work related to the origin, classification, and causes of urinary calculi, with engravings. He left two manuscript lectures on the *History of Anatomy*, and one most interesting paper *On the Uncertainty of the Signs of Murder in the case of Bastard Children*. This latter paper was read to the members of the Society of Physicians after his demise, viz., on July 14th, 1783, and was first published in the sixth and last volume of the *Medical Observations and Inquiries*, in the year 1784. The reader is fascinated with this paper and its admirable reflections. It shows at once not only the science, but the philanthropy of its author. He pleads for the wretched women who are accused of crime with all the eloquence of a powerful writer and the caution of a philosopher. He gives sound advice to medical witnesses, which might be read still with advantage; and entering into the merits of the hydrostatic test, as applied to criminal cases, he describes its value and its fallaciousness with an acuteness and certainty which have never been surpassed.

In addition to the many scientific acquirements of William Hunter, I must not omit to mention his skill in the art of embalming, in which art he took a leading part in the introduction of the method of injecting a preservative solution by the arteries. Sometimes he practised the art. In the Royal College of Surgeons, in Lincoln's Inn Fields, there is to this very hour a proof of his skill in the embalmed remains of Mrs. Martin Van Butchell, the wife of the eccentric man of that name. This embalming was the event of its day. In one way or another it lasted, as an operation and

as a sight, for about three weeks. The most exalted personages "went to see," and all fashionable London was wide awake to the proceeding. Pettigrew has left a most interesting account of the event, gathered, I have heard, from some who were cotemporary with it.

Our time flies, and we must part with another of our Great Ones. His time comes towards the end of March, 1783. He is sixty-four years old—not more, but his life has been double that of most men of the same age. On Saturday, the 15th of March, he suffers from so much pain and nausea that he must go to bed and rest. The next Thursday he is better; and this being the day fixed for the delivery of his introductory lecture on the Operations of Surgery, he will be up and doing his work. His friends remonstrate in vain. He gives the lecture, but at the end is carried away fainting. He therefore is again returned to the sick-room. During these days of illness John Hunter comes and implores to see his patron. The patron assents, and allows John to take part in the treatment, but does not enter warmly into conciliation. On Saturday morning Mr. Combe, who is the favourite attendant, finds his patient with speech and pulse perfect, and able to rise in bed, but himself diagnosing the existence of a paralytic seizure. The diagnosis is too correct: and so, dying daily, till Sunday, March 30th, William Hunter leaves the museum, and the chariot, and the school, and the sorrowing friends, and the world, in the conscious and calm quiet of one who has lived the representative of a single principle—Duty. His death scene is a model of fortitude. He is a traveller worn out with the fatigues of the day, and would sleep, having no dread of the darkness. "If," said he, in his last utterance, to Combe,—“if I had strength to hold a pen, I would write how easy and pleasant a thing it is to die.”

William Hunter was buried on Saturday, April 5th, 1763, in the Rector's vault of St. James's Church, Westminster, and his remains lie there, I believe, to this day.

SUMMARY.

We have learned already much of the character of this anatomist. What is left, in the way of summary, need not detain us long. His intellectual position was not, by nature, of the highest level; but he raised himself by honest arts to a place prominent among men. The faculties by which he prospered were—industry,

perseverance, and ready observation. In one passage of his last-written introductory lecture, he sums up himself and his powers thus fairly :—

“Every man should be held as a criminal who locks up his talent, whatever it may be. Mine, from nature, was small ; but by application and perseverance it has grown to be considerable.”

He had industry and truth, two leading elements in the quality of greatness ; but he had no more. He could never have discovered a new system of worlds, like Copernicus ; a new world over the way, like Columbus ; or the circulation of the blood, like Harvey. His talent lay in collecting observed natural facts, and in keeping a most faithful record. He was anything but a superficial man ; and yet a man who dwelt only on the surface of thought. The faculties wanting in his nature were courage, liberty, and construction. His skull was too small for his brain.

With the peculiarity which marks men who have immense energy, and immense mental wealth the fruit of industry, but who are deficient in liberty and expansion of idea, he was fond of controversy and of convulsive efforts at self-defence. He had no conception that history would defend him in the right with more power and more taste than he himself could put forth. Whoever might attack him, he must be up and at them, and the more he defended the more he attacked.

But, setting aside these deficiencies in Hunter's character, it is impossible not to admire the man for his industry, his devotion, his zeal, and his ambition. There is no question that he was a great teacher, and knew the secret of success in the teacher's vocation. In the two lectures left behind him, and published after his death, many very interesting facts are brought out, illustrating this trait. He announces here the plan of his course, the time of lecture—two to four p.m.—the mode in which students may introduce a friend, and the mode of studying anatomy. He adds, too, excellent opinions as to the qualifications of the lecturer. One of his observations on this latter point is so very appropriate that I give it in full :—

“I have always studied,” he says, “and shall continue my endeavours to employ the time that is given up to anatomical studies as usefully to the students as I can possibly make it ; and therefore shall never aim at showing what I know, but labour to show and describe as clearly as possible what they ought to know. This plan rejects all declamation, all parade, all wrangling, all subtlety.

To make a show, and to appear learned and ingenious in natural knowledge, may flatter vanity; to know facts, to separate them from suppositions, to arrange and connect them, to make them plain to ordinary capacities, and, above all, to point out the useful applications, is, in my opinion, much more laudable, and shall be the object of my ambition."*

We must further acknowledge his devotion to science, and his self-sacrifice. Those of his cotemporaries who did not like the *one* glassful of post-prandial wine thought him penurious. But he was no more guilty of parsimony than Morgagni, whom, indeed, he closely resembled. Not at all. Each penny misspent was to him as so much taken from the future, and from the world in the future. He lived, in fact, not for himself, not for his friends, but for his race all the world over—for his race then and thereafter. We must admire his industry and perseverance. He who could work for thirty long years at one point, never leaving the subject so long as doubts remained and fresh evidence was obtainable, must be a man of science. With the exception of Kepler, there is hardly in history a man to be found whose perseverance was more steady, or whose industry was more severe.

Lastly, we must cherish the recollection of William Hunter for an all-important reason—the correctness of his observation. Reading through his various works we find that, whatever their shortcomings, they are pre-eminent in one particular. In so far as they go they are as truthful now as they were at the time they were written. He is an author without one error of an important kind. Need more be said? Genius, haply, were wisely dormant in William Hunter.

* In the Library of the Royal Medico-Chirurgical Society there are several volumes of MS. lectures of Hunter. These are of great interest, as indicating the method of his teaching, although they are not notes by the lecturer himself, but by students who attended the courses. One volume, written by a careful hand throughout, bears on the cover the following: *Anatomical, Physiological, and Chirurgical Lectures by Dr. Hunter, 1759*. Three other small books in MS. are entitled *A course of Anatomical Lectures by Dr. Hunter, January 20th, 1773*. A third volume of MS., very carefully written out, gives, again, the *Anatomical Lectures*, without date, but with writer's name, *John Ashley*; and a fourth volume in MS., including the lectures on the *Gravid Uterus*, is by *Dr. Skeete*. The care with which these MSS. have been copied indicates the value attached to them by the writers. In the Library of the Medico-Chirurgical Society there will also be found, bound up with the last two introductory lectures of Hunter, some papers relating to his intended plan for establishing a museum in London for the improvement of Anatomy, Surgery, and Physic.

On putting side by side the historical figures of William and John Hunter, we are struck with a view of similarities. Differences there are ; but these are in degree rather than fact. William, truly, is seen as a scholar, and a man of refined professional feeling. John cracks scholastic schemes, and has a sufficient want of professional refinement to encourage Jenner to make his fortune by a secret remedy. But in science John follows William like a shadow. William is great in anatomy ; John takes up the scalpel in imitation. William inquires into causes of animal functions, deducing from what he sees ; John takes up the same points, but plunges into the unknown, and adds speculation to fact—differing so far, and no farther. William has a longing to collect strange specimens and found a great museum ; John is after William again, and having the good fortune to live ten years longer, does ten years' more work. William has the power of inducing many helping hands to work for him ; John sees the force of the policy, and presses everybody he can into his service. William has a taste or natural history, and opens the wicket of Paleontology ; John, seeing the wicket open, walks into the ground beyond, and, finding it fruitful, digs into it to immense advantage. William likes painting and artist work in general ; John is seized with the same disposition. William learns how to work twelve hours a day ; John pushes on for thirteen. Finally, to change the analogies, both have pride, and the two are as one in this matter of self-satisfaction, that although there are men in the world exceedingly clever, they two are *the* men.

On the Continent the name of William Hunter stands probably in estimation before that of John ; in this country, if a Hunter is named, everybody thinks that John is meant. Dr. Priestley, in his able lectures on the Gravid Uterus, advanced the idea that on looking into the labours of William Hunter one is tempted to think that, for profundity of observation and true sagacity, he was in no respect the inferior. There must, nevertheless, be a cause for the popularity of John in this country, and a cause there is ; but the cause lies not in correct public estimation of the scientific works of the two brothers. To be explicit, the College of Surgeons, having the good fortune to possess John Hunter, has found him more useful in death than in life. True, it had William Hunter too ; but William, from becoming a physic-man, and from sending to Glasgow his museum, was not to the College *the* Hunter. The College, consequently, for the most obvious reasons, true to itself and John Hunter, but especially to the College, has preached up its man to

such a pitch that the other man is lost in the exaltation. Every temple has its deity, and sacrilege is sacrilege. But if by these presents I can induce my readers to peruse carefully the life and works of the two Hunters, and to draw their conclusions on the grounds of scientific merits alone, the statement underneath will receive, I believe, universal sanction :—

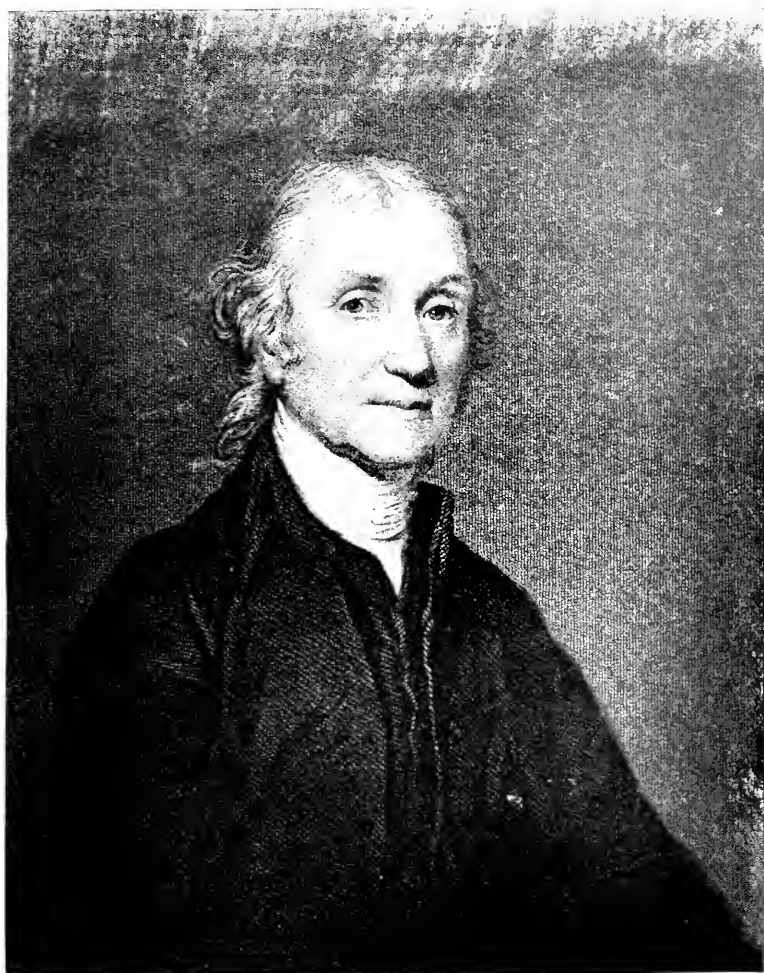
THE BROTHERS HUNTER WERE TWINS IN SCIENCE, AND WILLIAM WAS THE FIRSTBORN.

Joseph Priestley, LL.D., F.R.S., and the Discovery of Vital Air—Oxygen Gas

IN the strict sense of the word Joseph Priestley did not belong to the brotherhood of medicine. In a general sense he did, for he belonged to all brotherhoods of learned men. Also to no order of learned men did he render more important service than to our order, for he unlocked one of the secret recesses that led to the mystery of life. There needs no apology, therefore, for placing Priestley amongst our great physiologists and philosophers, whose life and works no son of *Æsculapius* can study without being wiser and better for the labour.

Joseph Priestley was born at Fieldhead, near to Leeds, on the 13th of March (Old Style), 1733. He was the firstborn of his parents, people of very simple and industrious lives. His father, Jonas Priestley, was a dresser of woollen cloth, as was Joseph Priestley, the father of Jonas. His mother was the only child of Joseph Swift, a farmer at Shafton, a village six miles south-west of Wakefield.

Five other children were born to Jonas and Mrs. Priestley, three sons and two daughters, the mother of them dying when our Joseph was about seven years old. Three years later his father married again, and by his second wife had three daughters. Joseph could remember but little of his mother, but was able to recollect that she was careful to teach him the Assembly's Catechism, and to give him the best instruction during the little time he was with her. Once, in particular, when he was playing with a pin she asked him where he got it; and on his telling her that he found it at his uncle's, where he had been playing with his cousins, she made him carry it back again, the place being near, in order to impress on his mind, as she did, a clear idea of the rights of property and of the importance of



J Priestley

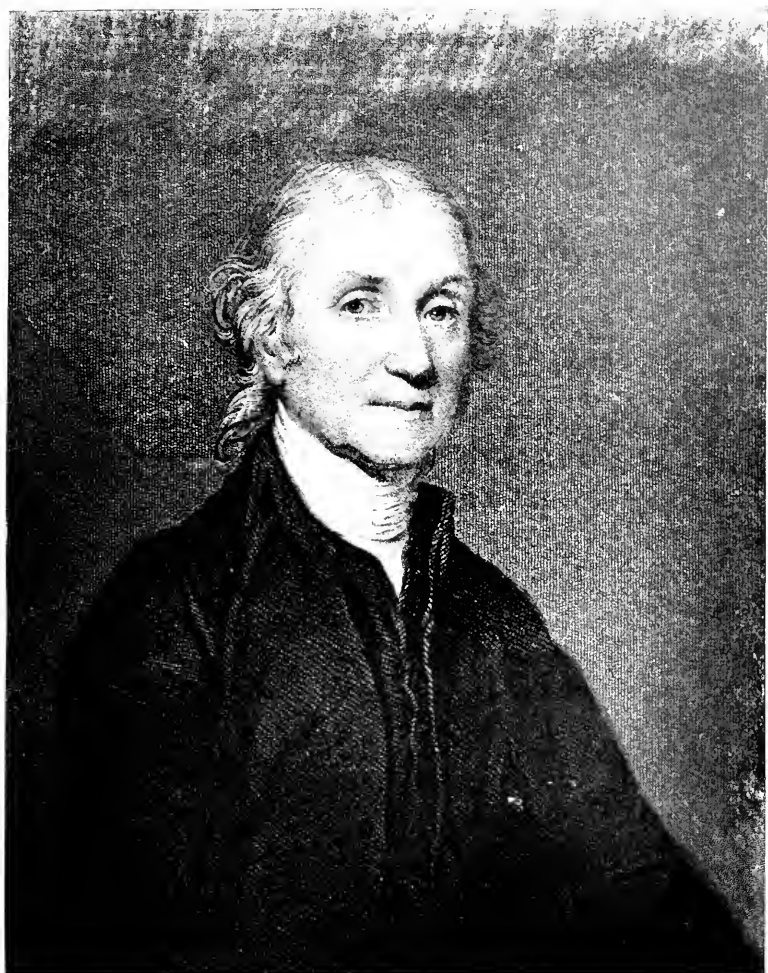
Portrait by Gilbert Stewart, engraved by W. Holl. Facsimile autograph from a letter in the possession of W. Averend Priestley, M.D.

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attending to it. "She died," he says, "in the hard winter of 1739, not long after being delivered of my youngest brother; and having dreamed, a little before her death, that she was in a delightful place, which she described, and imagined to be heaven, the last words which she spoke were, 'Let me go to that fine place.'"

After the loss of his mother Priestley lived for a time with a maternal uncle, but was removed from him in order that his brothers and sisters might be allowed, in turn, to share in the same advantage; and, his father being encumbered with a large family, he was sent to school near to his home. He did not remain in this position long, for a sister of his father, Mrs. Keighley, who was childless, took a liking for him, and became to him a second mother. Soon afterwards Mr. Keighley died, and being a man of considerable property, all of which he left to his wife, the accepted, if not adopted, son found in the house of his aunt a home from 1742 until he entered his academic career.

STUDENT LIFE.

Mrs. Keighley encouraged her nephew to enter the Christian ministry, to which vocation he was himself greatly inclined. Unfortunately his health showed signs of giving way, and he was induced to try some pursuit that should not severely tax his mental powers. He must, he thought, go into trade, and having great facility for learning languages, rapidly taught himself French, Italian, and High Dutch, in the first and last of which he translated and wrote letters for one of his uncles who was a merchant, and who intended to place him in a house at Lisbon. Fortunately for learning and for science, although a house was actually engaged to receive him in Lisbon, and everything was ready for his voyage, his health improved, and his old determination to enter the ministry returned. He was, therefore, sent to Daventry to study under *Mr.* Ashworth, afterwards the widely-known *Dr.* Ashworth.

It is worthy of remark in this part of the early life of Priestley, that in the interval between his leaving school and entering *Dr.* Ashworth's Academy at Daventry, he began to acquire a taste for mathematical and other scientific studies. *Mr.* Haggerstone, a Dissenting minister in the neighbourhood, taught him geometry, algebra, and various branches of mathematics, theoretical and practical; he read also *Gravesend's Elements of Natural Philosophy*, *Watts' Logic*, *Locke's Essay on the Human Understanding*, and other

classical works. In these studies he made such proficiency that when he joined the Academy, in the year 1752, he was excused all the exercises of the first year, and a great part of those of the second.

In following Priestley through his academical course two incidents which tended greatly to shape his after life require to be recorded. In going to hear any discourse he got into the habit of committing the heads of it to paper. By this means he rested his memory. He did more: he learned to compose in a rapid and lucid style, a gift which proved to be of the utmost service to him in all his subsequent work.

The second incident to which it is necessary to refer relates to a change of mind and an emancipation from early dogmas, which made him a new man in the midst of men. A personal matter led to the change named. In his desire to jot down quickly what he heard or thought, he determined to learn shorthand, and for that purpose purchased Annet's book on that subject. Thinking he could suggest some improvements in shorthand, he wrote to the author, and in that way established a correspondence which lasted several years. Annet was a man of free thought, and an advocate of the Necessarian doctrine, on which latter topic he and his pupil corresponded freely. At the beginning of the controversy Priestley defended philosophical liberty against the Necessarian school; but in due course he, too, became a convert to Necessarianism, and at the close of his life declared that "he had derived the greatest advantage from the full persuasion of the truth of that doctrine."

Let those who wonder at the conversion of Joseph Priestley to these views think the matter out, and the wonder itself will pass into the rule of necessity. In plain terms, Priestley in becoming a philosopher became also what he was bound to become, a philosophical Calvinist. As a child he had been taught that everything is pre-ordained; as a man he learned that in Nature everything goes by fixed laws: so that Nature and Calvinism—if it be not insult to Nature to link her name with John Calvin—are one and the same.

Under Dr. Ashworth Priestley remained three years, from 1752 to 1755, and during the whole time, he tells us, his days passed "with that peculiar satisfaction with which young persons of generous minds usually go through a course of liberal study in the society of others, in the same pursuits, and free from the cares and anxieties which seldom fail to lay hold of them when they come out into the world."

In the course of his studies in the Academy Priestley began to read Hartley's *Observations on Man*, a book which produced the greatest and, as he believed, the most favourable effect on his general turn of mind, throughout the whole of his life. It established in him the belief of necessity; it greatly improved his disposition to piety, and it freed him from the rigour with which his piety had been tinctured. Step by step he moved out of the pale of strict orthodoxy into the pale of ancient Arianism, and such was the spread of this phase of faith in and amongst his fellow-students, that the whole of them were more or less influenced by it.

These were the courses by which our aspirant for the ministry prepared his way for that vocation, and by which he became, in the end, one of the sect of Socinians, the sect better known, with some modification of doctrine, as Unitarian. He was already a student of natural as well as of orthodox religion; already he had conspired with himself to live by sight as well as by faith, and had composed a copy of *Institutes of Natural and Revealed Religion*.

An exceedingly characteristic trait belonging to Priestley was developed in this period of his career. He suffered from "a thorn in the flesh." He had a family failure of speech, the failure of stuttering, or stammering. It was a cause of much distress to him. "However," he adds, "I hope it has not been without its use. Without some such check as this I might have been disputatious in company, or might have been seduced by the love of popular applause as a preacher: whereas my conversation and my delivery in the pulpit having nothing in them that was particularly striking, I hope I have been more attentive to qualifications of a superior kind."

FIRST MINISTRY.

With this acknowledged inferiority in pronunciation, and with a fearful heresy in his breast, the young philosopher entered on his first ministerial charge at Needham Market, in Suffolk. He delivered his first sermon to a small congregation of about one hundred people. Like Goldsmith's vicar, his stipend was only about forty pounds a year, and yet for half a year or so everything seemed promising. Alas! he ventured too far: he opened a series of lectures on the theory of religion; several of the audience began to doubt his orthodoxy; his congregation began to fall off apace; and, although some of the best families remained with him, his salary came short of thirty pounds per annum, and had it not been for

Dr. Benson and Dr. Kippis, who now and then got for him five pounds from different charities, he could not have been sustained. Added to these misfortunes came another—namely, the absence of remittances from his aunt, who, partly owing to the objection she had taken to his new religious views, and partly to the fact that she had expended her income more freely on other objects, had drawn together the strings of her purse in so far as he was concerned. Finally, with his entire assent, she left the whole of her property to a niece who was deformed, and who was most in need of the bequest.

But what contributed greatly to his distress was the impediment in his speech, which increased so much that relief was necessary. He came, therefore, for the first time to London, with twenty guineas supplied by his aunt, in order to go under the treatment of one Mr. Angler, a “specialist” in the treatment of stammering. Angler attended him about a month, making him take an oath not to reveal his method. He received some benefit, but soon relapsed, and became worse than ever.

On returning to Needham Market Priestley began to feel the effect of a low, despised situation, together with that arising from the want of popular talents. He worked laboriously, and his life at this place was monotonous enough; but it is remarkable as being connected with another development of thought which led him ultimately into science, and to the final grandeur of his brilliant career.

THE TOUCH OF SCIENCE.

In order to make both ends meet he commenced to give lessons in natural science to about ten pupils, to whom he taught the use of the globes, and the simple elements of natural philosophy.

After a weary sojourn of three years in this ministry, Priestley, through the friendship of Mr. Gill, a maternal relative, was invited to preach as a candidate at Sheffield. He was not approved, but Mr. Haynes, another minister, recommended him to a congregation at Nantwich, in Cheshire. He accepted the post in 1753, and coming first to London, went from thence to Nantwich by sea, to save expense.

At Nantwich he found a good-natured, friendly people, with whom he lived three years very happily, and amongst whom he established a school of thirty boys, with a separate room for some half-dozen young ladies; he also gave lessons out of doors, and yet found time

to learn to play on the flute and to compose a new grammar of the English language. He seems to have prospered also in a worldly point of view, but receiving an invitation to join an academy at Warrington as "tutor in the learned languages," he migrated there, and applied himself, with all the honesty and energy of his character, to his new duties.

Whilst at Warrington the greatest event of his life happened to Priestley : he fell in love with Miss Wilkinson, the daughter of Mr. Isaac Wilkinson, an iron-master of Wrexham, and sister of one of his pupils. His suit was successful, and he was so fortunate as to marry one who was, he says, "a woman of excellent understanding, much improved by reading, of great fortitude and strength of mind, of a temper in the highest degree affectionate and generous, feeling strongly for others and little for herself." She was also a good housewife, and relieving him of all household cares, allowed him to devote all his time to his studies and to the other duties of his station. At Warrington he had born to him a daughter, Sarah, who afterwards became Mrs. William Finch, of Dudley.

The taste for teaching science inaugurated at Needham Market was continued at Warrington, and led to the delivery of a course of lectures on anatomy. Once a year also he came to London in order to gather up new information, and to make new friends and acquaintances, in which he was so happy, that he added to his list of friends Dr. Price, Mr. Canton, and the famous Benjamin Franklin.

At this point in the career of Dr. Priestley we come to the period when, in the true sense of the word, he may be ranked as a man of science. Gaining a close acquaintance with Dr. Benjamin Franklin, he conversed with that most remarkable man on the question whether or not he should tackle a history of electricity. Franklin received the suggestion favourably ; the great work—still a great work—was commenced, and by steady perseverance was brought to a close so quickly, that although it was perfect in all its parts and quite unique in its compendiousness, it was judged by the critics, who could not have touched the work themselves, as too hastily done. During this same period he also drew up a chart of biography, after which the University of Edinburgh conferred on him the title of LL.D., and the Royal Society, at the instance of Franklin, Watson, Canton, and Price, enrolled him as a Fellow.

In 1767 Priestley removed from Warrington to take charge of the congregation of Mill Hill Chapel, Leeds, where he spent six of the happiest years of his life, "finding scope for every kind of

exertion," and ever considering "the office of a Christian minister as the most honourable of any upon earth."

INTRODUCTION OF PNEUMATIC CHEMISTRY.

Nothing foreign to his duties as a minister occupied his attention at Leeds so much as his experiments in *electricity*, and especially "the doctrine of *air*." He was led to study this last-named subject in consequence of inhabiting a house adjoining a public brewery, where he first amused himself with experimenting on the fixed air which he found ready-made in the process of fermentation. These experiments, performed at first for amusement, absorbed his attention so much that when he removed to another house he commenced to manufacture the fixed air, afterwards called carbonic acid gas, for himself; and, in short, was led to the discovery of what soon became known, from him, as *pneumatic chemistry*—the liberation, collection, and examination of gases.

Whilst residing in Leeds Priestley made the acquaintance of the famous Leeds surgeon, Hey, known so widely since his own time down to ours by the surgical saw that bears his name, and by many excellent memoirs on surgical subjects. Hey in the religious world was a zealous Methodist, and was given to attack his Socinian friend sharply in public controversy; but on matters of science they were on excellent terms, and the zealous surgeon was ranked by Priestley as one of the only men in Leeds who took a real interest in his experiments. When Priestley left Leeds Hey begged of him the earthen trough which had been used in the first researches in pneumatic chemistry. It was a common trough, says Priestley, "such an one as is commonly used for washing linen;" but Hey knew the important part it had played, and prized it as a rare present.

During this portion of the life of Priestley the great navigator Captain Cook was starting forth on his second voyage of discovery, and it was proposed that Priestley should accompany him as the naturalist of the expedition. To this he assented, and as the members of his congregation were willing to appoint a substitute for him during his absence all seemed likely to go well. But certain clergymen on the Board of Longitude took alarm at the news of his religious opinions, and had influence enough to get his appointment set aside and to have Dr. Forster put in the place. With characteristic candour and simplicity our philosopher resigned

himself to his fate—what could a Necessarian do less?—expressed that Forster was far more fitted for the post than he was, and went on with his own congenial studies and pursuits, as if nothing had intervened to turn his thoughts from the natural course in which they were accustomed to flow.

At Leeds two sons, Joseph and William, were born to Priestley, and altogether he was very happy there; but his income was only one hundred pounds a year, with a house, which was not large enough for his increasing family. He therefore, on the recommendation of Dr. Price, left his ministry after holding it for six years, in order to become, nominally, librarian to Lord Shelburne—later on the Marquis of Lansdowne—with a salary of two hundred and fifty pounds a year, a house to live in, and a certainty for life, on the death of the Earl or of separation from him, of a pension of one hundred and fifty pounds per annum.

It is curious to trace the influence of this change of life on the philosophic and scientific minister. In some respects it was good, in others bad. It gave him freedom to pursue his researches, for the librarian work was of little moment, and by carrying him abroad it widened the sphere of his knowledge and acquaintanceship. It also gave him a kind of independence for life. On the other hand, the position exposed him to the whips and scorns of patient merit. The plain truth seems to be that the Earl, proud of the acquisition of a librarian and dependant who was a figure of true mark in the world of science and letters, was at first all smiles and kindness, then, cooling down, became courteous, in a later stage cold and polite, and at last, tired of his poor servant, abruptly ready to turn him off and see him no more, not even extending to him the courtesy of a reception to a friendly call, and not indeed knowing that there was such a man as Joseph Priestley until some new service was wanted of him. The old lines of insolent pride and wretched poverty of wealth.

The Priestley family moved from Leeds to Calne in Wiltshire, to be near to Bowood, where the Earl resided in the summer; and, sometimes in Wiltshire, sometimes in London, sometimes abroad, Priestley remained with the Earl for seven years. In the second year, in company with the Earl, he made the tour of Flanders, Holland, and Germany, as far as Strasburg, spending a month finally in Paris. In Paris he met the famous Magellan, with whom he spent delightful days, and with whom he returned to England.

NEW SCIENCE WORK.

We have arrived now at a time when Joseph Priestley was in his forty-second year, and, still in days of favour with the master he was nominally serving, was free to carry out some researches which had occupied his thoughts at Warrington. He resumed his experimental pursuits, and was encouraged in his work by Lord Shelburne, who liking to see him perform his experiments "to entertain his guests, especially foreigners," allowed him a sum of forty pounds a year for the simple apparatus required for the great service to science performed in the laboratory at Calne. This is the time when we, as medical men, are more than any others, interested in the work performed, since it revolutionised our science beyond anything that had been accomplished from the time William Harvey disclosed the secret of the circulation of the blood.

The grand discovery that came to the world from Calne, in Wiltshire, by the labours of Priestley, was that of *Vital Air*, or, as we now call it, *Oxygen Gas*. We must be just in thinking of this discovery, and of the part which our present great man, its true discoverer, took in it. We must be as fair as he would be himself, and if we are that we shall be fair enough, for never in the history of original men was there one fairer or juster than he in accepting and acknowledging the claims and labours of his predecessors and of his fellow-workers.

It had long been believed, before the time of Priestley, that there exists in the air some vital spirit or principle which is absorbed by living animals in the act of breathing, and which, removed from a confined chamber of air, reduces the quantity of air, as if something were lost from the air. In the life of John Mayow we see how that neglected Genius anticipated the discovery of the vital spirit of the air, and how he actually forecast the discovery of the existence of that vital spirit as present in saltpetre—nitrate of potassa. But up to Priestley nothing had been demonstratively done to separate from the air, or from any other substance, this spirit of the air. Certain phenomena had led to the inference that such a thing must exist, just as in our own time certain external phenomena led astronomers to infer that a planet existed the other side of Uranus; but the thing itself was not revealed to the senses. Priestley revealed it, but he had first to overcome a prejudice that the atmospheric air is anything more than air combined with an inflammable something, called, before his day, Phlogiston.

The mode in which the discovery was made was simple of the simple. Its author is particular to nicety in impressing this fact on the attention of his readers. He says that "the record of his discovery furnishes a striking illustration of the truth, which can hardly be too often repeated, that in philosophical investigations more is owing to what is called chance—that is, philosophically speaking, to the observation of events arising from unknown causes—than to any proper design or preconceived theory in the business."

How Priestley got at vital air is clearly told by him in his essay *On Dephlogisticated Air and the Constitution of the Atmosphere*, in the second volume *Of Experiments and Observations on Different Kinds of Air*, published in 1775, one year after the discovery. He says that after he had satisfied himself that the air "was alterable," he came to the conclusion that it was not an elementary substance, but a composition. Then he began to think "what this composition could be, or what is the thing that we breathe, and how is it to be made from its constituent principles?"

Previously to this time he had been extracting air from a great variety of substances by means of the heat obtained by a burning-glass. His plan was to put the substance he wished to decompose into a conical-shaped glass vessel, and then to fill the vessel with mercury. The vessel was now inverted over mercury, by which means the powder to be decomposed was brought to the inside surface of the glass, between the glass and the mercury, in such a manner that the heat of a burning-glass could be made to play upon it. If under the influence of the heat any gas were liberated, it displaced the mercury and was retained in the vessel ready for examination.

DISCOVERY OF VITAL AIR—OXYGEN.

With this apparatus Priestley discovered at Calne what we call oxygen, on the 1st of August, 1774. "I endeavoured," he says, "to extract air from *mercurius calcinatus*, *per se*, and I presently found, by means of this lens"—a lens twelve inches in diameter and twenty inches focal distance—"air was expelled from it very readily. Having got about three or four times as much as the bulk of my materials, I admitted water to it, and found that it was not imbibed by it. But what surprised me more than I can express was that a candle burned in the air with a remarkably vigorous flame, very much like that enlarged flame with which a candle burns in nitrous air, exposed to iron or lead sulphur; but as I got nothing like this

remarkable appearance from any kind of air besides this remarkable particular modification of nitrous air, and I knew no nitrous acid was used in the preparation of *mercurius calcinatus*, I was utterly at a loss how to account for it."

In the above lines we get the history of the discovery of oxygen, but we are not at the end of the original chapter. From the *mercurius calcinatus* the discoverer moved to *common red precipitate*, a substance obtained by acting on a solution of mercury with spirit of nitre. From this red precipitate he again extracted the remarkable air, by the heat of his burning-glass, and feeling sure that the liberated spirit or air had been communicated to the mercury by the nitrous acid, he drew, for the first time, the inference that as *mercurius calcinatus* is produced by calcining mercury in common air, therefore mercury in the act of calcination *takes something from the air*, which something is, again, yielded up when it is subjected to heat.

At the same time that he extracted the air from the *mercurius calcinatus* he liberated it also from *red lead* or *minium*, and he observed in this process that part of the red lead on which the focus of the lens had fallen turned yellow. One-third of the air in this experiment was readily absorbed by water, but in the remainder a candle burned very strongly and with a crackling noise. This experiment with red lead confirmed him in the idea that the *mercurius calcinatus* must get the property of yielding the new kind of air from the atmosphere, the process by which red lead is made being that of calcination.

From November 1774 to March 1775 Priestley continued his researches on his new product without fully realising the treasure that was in his hands. He found that, as a gas or air, it was not very soluble in water; he found it would keep so purely that after several weeks a candle would still burn in it with undiminished splendour. And now he made a new experiment with his treasure, which opened his eyes still further as to the composition of the atmosphere that surrounds our planet, and the nature of its vital services.

He had observed in some previous researches that when nitrous air, got by acting on copper with nitrous acid, and now called nitrogen dioxide, was exposed to common air, it became a gas or fume of deep red colour, readily absorbable by water, to which it imparted an acid reaction. The fact led him to try what would be the effect of exposing his new gas or spirit to the same test. He

put one measure of nitrous air to one measure of the new air, and found not only that the mixture of the two gases was freely absorbed by the water, but that the red fumes were produced just in the same way as when the nitrous air was mixed with atmospheric air; after which he had no doubt that the air from *mercurius calcinatus* was fit for respiration, and had all the other properties of genuine common air.

The line of experiment carried so far must needs lead to something more of a vital character. Would the newly-discovered air, in which a taper would burn so brightly, support also the animal fire?

On March 8th, 1775, a living mouse was put into a glass vessel containing two ounce measures of the air from *mercurius calcinatus*. Had common air been used, a full-grown mouse, as this was, would have lived in it about a quarter of an hour. In this air "my mouse," says Priestley, "lived a full half-hour, and though it was taken out seemingly dead, it appeared to have been only exceedingly chilled, for upon being held to the fire it presently revived, and appeared not to have received any harm from the experiment." Later on another mouse was subjected to the same experiment, and lived in the gas for three-quarters of an hour.

This was the discovery of vital air, a discovery of first rank in science, and truly vital in its import. That it was enveloped at first in a web of what now appear to be childish difficulties was no more than might have been expected, for nitrogen had still to be separated as a constituent part of the common atmosphere; but the discovery of vital air led the way to this separation, and "the nitro-aërial spirit" of John Mayow was revealed practically to mankind.

MEDICAL AND HYGIENIC DISCOVERIES.

As a gift to physiological medicine we may look upon this discovery of Priestley as immortal. But one or two more discoveries, each of which would alone have made any man famous in science, require our regard.

The introduction by him of the pneumatic method of investigation constituted in itself an event in the history of scientific research. To this must be added the discovery of nitrous oxide gas, from which, under the genius of Humphry Davy, the grand development of modern anæsthesia afterwards took root. To these must also be added the plan of charging water with gases, and the entire introduction of effervescing medicines and aërated waters.

And yet another revelation, not precisely medical, yet distinctly hygienic in its bearings, comes to us from his masterly mind. I refer to the discovery of that interchange of gases which takes place between animals and plants. He detected that plants by their leaves absorb or take up the fixed air or carbonic acid which is evolved from the slow-burning bodies of living animals, or of quick-burning dead substances like coal; that they decompose this fixed air, utilize the carbonaceous part of it, and give back the vital air to the animal world. Plants, therefore, he argued, are the grand purifiers of the air and maintainers of the balance of life between the animal and vegetable kingdoms.

Other works of science contributed by Joseph Priestley to science, his labours on electricity, on vision, and on colours, I have not space here to describe. Neither have I the opportunity of so much as touching on his wonderful theological works, which in the presence of his scientific, have been woefully neglected. It is necessary to close the narrative by returning to the life of the illustrious scholar, and by tracing it to its perplexed, yet, to him, "born of a happy disposition," as he says of himself, happy termination.

RETURN TO THE MINISTRY.

I have stated, by anticipation, that after a few years—seven, in fact—Dr. Priestley left Lord Shelburne. Nothing else could be expected. Reflecting afterwards on the time he spent with Lord Shelburne "as the guest of his family," he was not, he could truly say, "fascinated with that mode of life." He was not unhappy, much less so than those who were born to the state, but he was happier when he got back to a sphere where there was a sufficient motive for exertion on other objects beyond amusement, more happiness, more virtue, more true politeness, and less necessity for disguising passions and feelings which must be concealed, but not without an effort as difficult as it is severe.

For some time before leaving Lord Shelburne Priestley found that, without any apparent cause, there was some dissatisfaction. He asked the Earl if he had any fault to find with him, and the answer was, "*None.*" The simple fact was that the great man became tired of his guest, and so, through Dr. Price, he offered him an establishment in Ireland, which was of course declined; and on this they parted amicably.

From Calne, where he had another son, named Henry, born to

him, Priestley returned to London about the latter part of 1778. Here he found many friends, who helped him generously on his way. Mr. and Mrs. Lindsey, Mrs. Rayner, Mr. Lee, Dr. Fothergill, Dr. Heberden, the Messrs. Galton, Mr. Wedgwood, and many others came gladly to his aid. But above all his other friends, as related to science, was the illustrious Benjamin Franklin. His account of their intimacy is most touching. They spent together the last day of Franklin's sojourn on English soil.

At the suggestion of his brother-in-law, Mr. John Wilkinson, Dr. Priestley, about the year 1780, settled down in Birmingham, where Mr. Wilkinson himself resided. Here, after a three months' stay, he joined an Independent minister, Mr. Blyth, in charge of one of the free congregations of that time, a position which was in every sense congenial to him, and which permitted him to pursue his scientific enquiries with the greatest facility amongst such friends as Boulton, Erasmus Darwin, Withering, and the immortal James Watt. These philosophers formed, at the time under consideration, a learned society, which they called the *Lunar Society*, because it was held at the period of full moon. Watt's "iron horse" was in course of development, and was truly in the womb of time; but it was not old enough to work a locomotive, so the friends, who lived long distances apart, were obliged to take advantage of the full moon in order to see their road home after their meetings. Once in my life, being at Leamington, I had the honour of breakfasting with one who had taken part in these gatherings—Mrs. Galton, the daughter of Dr. Erasmus Darwin. She recounted to me her vivid remembrance of a Lunar Society meeting at her father's house at Derby. She depicted herself as a young maiden receiving the visitors; she remembered her father coming up the garden to meet them, bearing a rose; she described making tea for them before their meeting; and she also remembered seeing them depart after supper, and hearing a friendly altercation between Priestley and Watt as to who should drive the horse that drew the gig in which they were seated to take their long night journey homewards.

DAYS OF STORM.

Life went on smoothly with our philosopher at Birmingham until 1789, when the question about the Test Act was much agitated in and out of Parliament. In the excitement the Dissenters in general, throughout the kingdom, became unpopular with the Court;

and, the established clergy being very active and bitter, the commotion grew hot and troublesome. The temper of the time was hard on the plain-spoken and honest Priestley. Mr. Madan, a clergyman in Birmingham, preached at him; and on the occasion of the celebration there of the anniversary of the French Revolution (July 14th, 1791) by some of his friends, but with which he, Priestley, had very little to do, a mob, encouraged by persons in power, first burned the meeting-house in which he preached, then another meeting-house in the town, and then his dwelling-house, demolishing his library, apparatus, and, as far as they could, everything belonging to him. As I pen these lines there lies before me a fine engraving of this disgraceful scene of desolation, from a picture once in the possession of Mr. Joseph Parkes, and presented to me by the great-grandchild of Priestley, my good friend Madame Belloc, *née* Bessie Parkes, poetess, and first editor of the *Englishwoman's Journal*. The picture,* Hogarthian in its treatment, and sketched on the spot, is a fearful scene of drunkenness, ignorance, bigotry, and misery.

That Priestley was in personal danger of his life is stated by himself, and I have been told by one who recollected the events perfectly that he would certainly have been killed had he been found at home when the mob reached his house. Fortunately he was from home, and, according to my informant, was saved by mounting a horse and riding on the road towards Worcester, the fact of his being on horseback, and some slight disguise, preventing him from recognition until he was out of danger. He returned to Birmingham no more to live, but removed to London as the safest place of abode until greater quiet prevailed. In London he was received by Mr. William Vaughan, and was soon afterwards invited by Dr. Price's congregation, at Hackney, to succeed, as their minister, that eminent man, who had recently died; a charge he accepted, together with another of a professorial kind in New College.

Good and true friends stood by Priestley at Hackney, and he had no wants that were not supplied. But in what were called the higher circles he was, as we should say in these days, a boycotted individual. Even the Fellows of the Royal Society, a society he had so largely honoured by his labours, "shunned" him, so that at length he was obliged to withdraw himself from them. It added to his misfortunes that when the National Convention of France was formed he was

* An impression of the picture is reproduced with this memoir.



THE BURNING OF DR. PRIESTLEY'S HOUSE.



invited, by many departments, to be a member of it, the honour of which he declined, but the mischief of which remained, his name being combined with that of Mr. Thomas Paine, who not only was invited, but who accepted the position, and but for the providential oversight of a gaoler, would have lost his head as the result. To what extent the antagonistic feeling influenced some of the persecutors of our scholar is shown by a doggerel which I once met with :—

“ All infidels and Jacobites
With old Tom Paine may go,
Along with Dr. Priestley,
To Beelzebub below.”

It is too painful to read the narrative Priestley has left us of the persecution to which he continued to be subjected. At the assizes at Warwick he was shamefully used. His eldest son, in business at Manchester, was forced out of partnership because of him. His neighbours in Clapton, where he had taken a house and started a laboratory, were seized with alarm lest his house should again be burned down ; and he was burned in effigy. The Government would afford him no protection, and Mr. Burke had the mean audacity to declare of him in the House of Commons that he was made a citizen of France on account of his declared hostility to the Constitution of this country, a statement Burke had “ neither the ability to maintain nor the virtue to retract.”

At length, under these persistent and cruel injuries and insults, only one remaining course was left open to this illustrious discoverer and benefactor of our country. Surely no darker blot stains our annals than the treatment of one of England’s truest, noblest, most patient, and most faithful children of light.

IN EXILE AND DEATH.

The sons of Priestley, finding no rest in their own country, sailed for America, and in the little settlement of Northumberland, in Pennsylvania, at the head of the Susquehanna river, found a new home for their father and mother, to which both retired, and from which, in the sixty-second year of his age, our still happy philosopher completed a sketch of his eventful life. He left England on April 8th, 1794, and arrived at New York on June 4th. Received very kindly at New York, he passed to Philadelphia, where he was presented with an Address from the *American Philosophical*

Society, and was unanimously chosen Professor of Chemistry of the University of Philadelphia, a post he felt he could not accept. In the middle of July he reached Northumberland, with a fixed determination to move no more. Here, therefore, a house was built for him with a laboratory, and here he continued his favourite studies in theology and his experiments in the field of science. In the morning he rose with the sun, lighted his own fire, and with slight interruptions for meals continued steadily at his work for a full period of six hours. The work finished, he rambled into the surrounding beautiful country, all new and varied to him, and, refreshed with the exercise, returned home ready to play with his grandchildren, or take part in some friendly game of chess or cards with his beloved wife or friends, until bedtime, an early hour with him. He was a good sleeper, "falling asleep as soon as he became warm," and waking early next morning, was ready to go through a day of work or care with any one of his compeers. Like Walter Raleigh, he was very fond of the garden; and, like most great men, he loved music, although, as a performer, he never got beyond the flute of which we have heard, and not far even on that despised instrument.

The life of Joseph Priestley was all gentleness. His face, as seen in the portrait presented—for the copy of which I am indebted to one of his honoured name and family, my old friend Dr. W. Overend Priestley,*—shows this fact better than any one can tell it; so also does his correspondence. A letter, lent also by my friend, from which the autograph at the foot of the portrait is engraved, tells the same story; it is to his sister about a relative who required aid, a letter graceful and tender, the very beauty of holiness. His address on leaving England is in similar tone, but loftier and more refined. In fact, there is only one passage in the history of all humanity that, in my opinion, approaches it, which passage I must leave the reader to divine, lest I may be thought irreverent in simile.

In the early part of the year 1803 Joseph Priestley, failing in vital power, began, for the first time in his life, to give up his usual occupations. Towards the end of January he lost, for a moment, the power of speech, but "never felt more pleasantly in all his life." He continued to fail, and was quite conscious of the fact. A friend calling on him, he observed, "You see, sir, I am still living." "You will always live," replied the friend. "Yes," he responded, "I believe I shall, and we shall all meet again in another and a better

* The late Sir William Overend Priestley, M.P.

world." On Sunday evening, February 5th, he had his grandchildren by his bedside, wished them good-night, and told them he was going to sleep as they were, for death was only a long sleep. At four in the morning of the 6th of February he called his son Joseph, took from him some refreshment, and then, reposing until ten o'clock, got him and Mr. Cooper to bring three publications which they had looked out for him. On these he dictated alterations, and, when the task was over and the new matter was read, he said, "That is right—I have now done." About an hour after, at his request, he was moved from his bed to a cot; and ten minutes later ceased to breathe, so easily that his son and his son's wife did not know he was dead. "He had put his hand to his face, which prevented them observing it."

My good friend, the late Mrs. Joseph Parkes, granddaughter of Joseph Priestley, who often conversed with me about him, who knowing my deep interest in his life and work was never wearied in answering my inquiries, and who supplied me with much information that has been of service in writing this short history, was one of the children to whom the illustrious man said the last good-night. She was then six years of age; and she told me that on the morning of his death, knowing nothing of the great event, she took her stool and her book, and going to the side of the cot on which he lay, sat down to read, thinking, from the placidity of his features, that he was simply in a gentle and natural sleep. She sat there, reading her lesson, as she had often done, in perfect happiness; when, to her surprise, her parents, finding her and gently removing her, explained to her what she could not at first believe or realise. Perchance it was the recognition of this or some similar scene that led another friend of the past, the late Sir John Bowring, to write the best verse of one of his exquisite hymns, which so fitly closes my present theme:—

" So through the ocean-tide of years,
The memory of the just appears ;
So through the tempest and the gloom,
The good man's virtues light the tomb."

John Freind, M.D., F.R.S., the Medical Historian

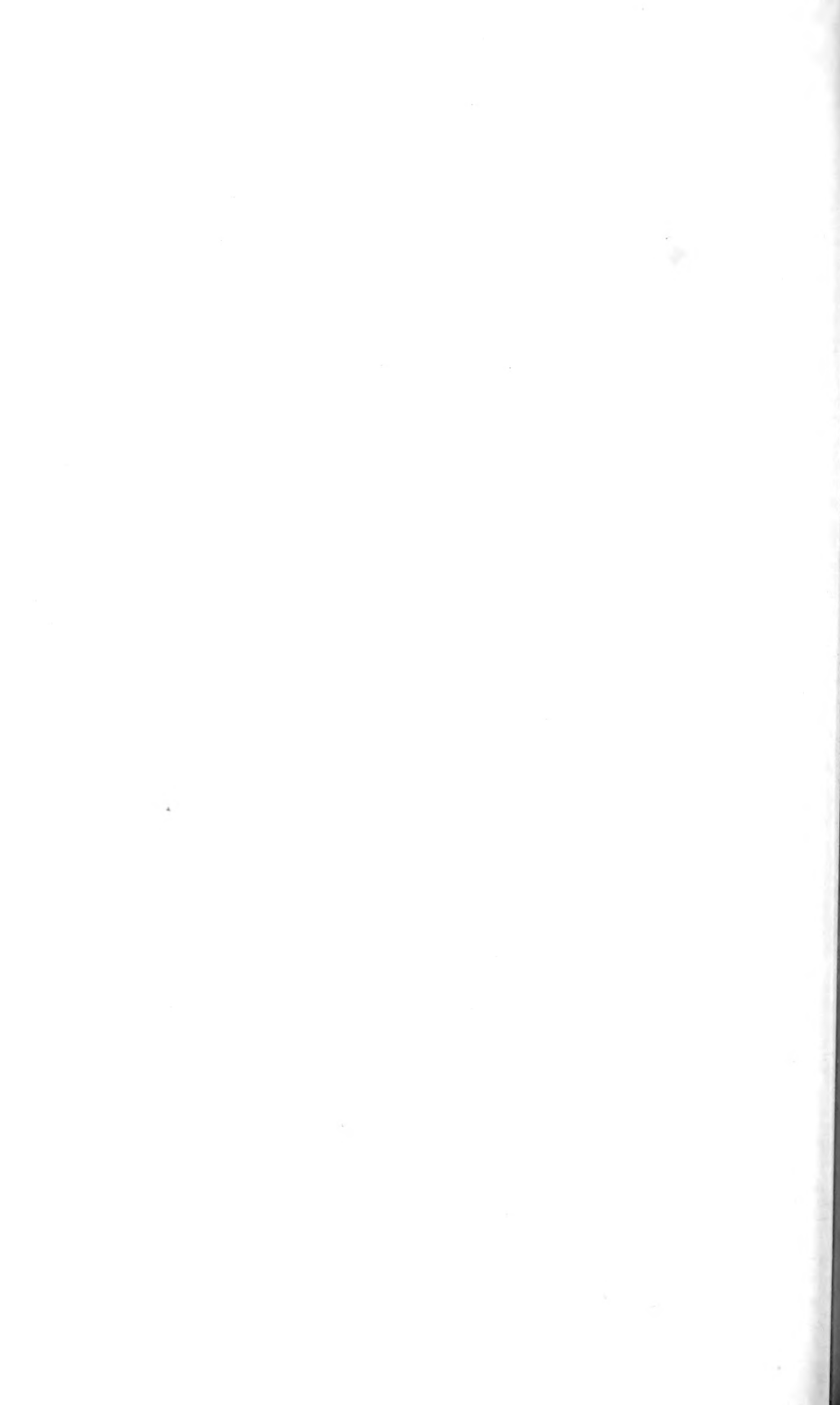
IN the physician whose life and works will now appear before us, there will be presented, in a few pages, a typical medical scholar and historian; a man of strong political sentiments also, and one who was not afraid to pay the penalty incident to independence of opinion on affairs of State, at a period when it was the easiest thing in the world to drop into disputations that cost the disputant his life. At the date of the birth of Freind, 1675, political troubles were reassuming the revolutionary character. The Commonwealth had been defunct over fifteen years, and a restored king sat on the throne; but there was no sound peace and no satisfactory feeling in regard to the succession, for although the reaction of royalty had been strong towards the second Charles, a staunch old Puritan spirit remained, and the idea that the Stuarts had about them, in some concealed recesses of their nature, a so-called Popish inclination, and a desire to re-introduce the ancient Church in all its glory, was rankling in the minds of the most sincere and still most powerful of the population. It was felt, in short, that the Stuarts were doomed, as rulers who could not be trusted; as men whom no warning, not even the removal of one of their kingly heads, could teach uprightness and straightforwardness in all their doings, and who must depart, whoever might be found to replace them in power. This state of political anxiety, in which he was born and bred, exerted, in a manner quite natural, as we shall see, a marked influence on him with whom we are now specially concerned.

William, the father of John Freind, a clergyman of the Established Church of England at the time of the birth of his famous son, was rector of the parish of Croton, in Northamptonshire, a charge which



JOHN FREIND, M.D., F.R.C.P., F.R.S.

From a portrait by Michael Dahl, presented to the Royal College of Physicians by George Owen Rees, M.D., F.R.C.P., F.R.S.



he conducted with exemplary character, piety, and judgment. In addition to John two other sons were born to this clergyman, Robert and William, to whom I may at once refer, and so remove them from the field.

Robert Freind went when very young to Westminster School, was advanced from thence to Christ Church, Oxford, graduated M.A. in 1696, was made second master of Westminster School in 1699, took D.D. in 1709, became rector of Witney in Oxfordshire, and head master of Westminster. Later in life he was appointed Canon of Westminster, and after resigning his position as Master of the Westminster School to his son William, continued his learned and useful life until August 1754, when he died at the age of eighty-four.

William Freind, the other brother of our historian and physician, became, like Robert, a clergyman of the Established Church, and under the patronage of one of his schoolfellows, Lord Winchilsea, was made chaplain in the Navy. This brother, who seems to have been the oldest one, was subjected to the strangest freaks of fortune. He twice won the highest lottery prize of his time, but owing to his unbounded hospitality and freedom with his money, fell into prison, and became so poor that he had to apply to Mrs. Pilkington for the loan of sixpence. In the jail in which he was confined he acted—so the lady just named tells us—as chaplain to a sort of congregation there, and although he discoursed most eloquently to his fellow-prisoners, they were “so mad drunk that they bade him hold his tongue; he indeed, like Orpheus, played to wolves and bears; nor were they half so obliging to him as the storms were to Arion; neither could he, though uttering dulcet and harmonious sounds, make the rude crowd grow civil with his song.” He died in 1745.

John Freind, with whom we now are exclusively concerned, was born, as we have seen, at Croton in 1675. He, with his brother Robert, was sent to Westminster School, where he came under the care and the cane of Dr. Busby. From Westminster he was transferred to Christ Church, Oxford; where, in conjunction with P. Foulkes, he published, in Latin, an edition of two Greek Orations, *Æschinīs contra Ctesiphontem, et Demosthenis de Coronā Orationes*; revised the edition of the *Metamorphoses* of Ovid which had been prepared for the Dauphin; became one of the “Bees” of his college under Dean Aldrich, and, dubbed the “Director of Studies” by the famous Boyle, fell under the lash of the still more famous Bentley, the Royal Librarian.

ENTRY INTO MEDICINE.

From the early part of his career Freind was devoted to the study of medicine, and began at once to connect with his classical studies those of physic, including anatomy and the then young and promising science of chemistry. The first evidence he gave of original work in medicine was in a letter to Dr. Hans Sloane, on a hydrocephalic head ; an effort followed in another letter, addressed to the same great authority, on some remarkable cases occurring in Oxfordshire of a rare convulsive affection ; one of those curious outbreaks of mental contagious disease which, like a true epidemic disease, excite for a time the wonder and even alarm of the districts in which they are manifested. The first of these letters was published in the *Philosophical Transactions* for September 1699 ; the second for March and April 1701 (No. 270).

From this period of his life, onwards through all his life, Freind held to physic as a profession, taking his line from the school of natural medical philosophers who had commenced to flourish, in his time, as the mechanical and physical interpreters of the natural phenomena of disease. These remarkable philosophers represented a school which, up to the days of Black and Cullen, was largely dominant, and was considered to be of the highest class. It was a school influenced by the genius of Newton, just as, in our own day, we have a school influenced by the labours of Darwin. It was a mathematical school, in which an attempt was made, far too early to ripen into anything seriously great, to bring the phenomena connected with mutable, variable, and dying things under the same laws as those which are recognisable in what is called dead matter, dead masses of materials which are not, according to our limited comprehension, mutable, variable, or mortal. As a necessity the school died out so soon as the science of life became more and more revealed in all its infinite subtleties ; but for a long period it held its own, and at its birth it had for its exponents men of such eminence that it is no wonder a scholar like Freind should be governed by it. The great physicists Borelli and Baglivi had laid the anatomical foundations of this mechanical school, and, in their department, had real scope for their labours ; while here, in our country, the ingenious and yet fanciful scholar Pitcairne had wandered into the mechanical art so argumentatively that a kind of certainty in medicine had entered the minds of the best educated medical men, leading them to hope and believe that a new era had arrived, in which a still rude

and vulgar art would quickly be brought under the control of a truly learned and certain system and craft.

In the year 1703, filled with the doctrines of the school of mechanical medicine, Freind produced his second work, in which he applied the mechanical theory to the study of the menstrual flux of women, by tracing the flux to a periodical plethora. The book was entitled *Emmenologia, in quâ Fluxus Muliebris menstrui Phenomena, Periodi, Vitia, cum medendi Methodo, ad Rationes mechanicas exiguntur*, 8vo. It is said of this essay that it was not accepted as minutely correct by the cotemporaries of its author, but was considered, on the whole, as a very good and learned treatise, written in excellent style, and with great perspicuity of language.

In the year following the appearance of the *Emmenologia* Freind was appointed Professor of Chemistry at Oxford. He held the post, however, only about one year, having been called upon to go out to Spain as physician to the Earl of Peterborough during the expedition conducted by that famous general of the forces. On the raising of the siege of Barcelona, in 1706, of which siege he afterwards wrote an account in defence of his general, he left the service of the army and proceeded to make the grand tour, visiting the most famous schools of Italy, and entering into personal communication with Baglivi, Lancisi, and others of the masters of physic who flourished at that time. In 1707 he returned home, and almost immediately published the political work above named, together with an additional piece called *The Campaign of Valencia*. In these essays we get a first taste of Freind on the political side of his character, a side which marked him out as something more than a physician, and which showed him to be a partisan who could fight as bravely as anyone for a cause he had deliberately espoused. From this moment, in fact, he became what is called a strong party man in political warfare, a position leading him into difficulties which, later on, influenced his career in a signal degree. But I must not anticipate.

In the year 1707 our active scholar, who had graduated B.A. in 1698 and M.A. 1701, was made a Doctor of Medicine of Oxford, and two years afterwards he published the series of lectures on Chemistry which he had delivered in 1704. These lectures were strictly Newtonian in their bearing, and were dedicated to the great Sir Isaac himself. The lectures were warmly criticised by the then rising school of German chemists, and were so misrepresented, as being of a mystical or occult character, that their author felt bound to defend himself respecting them in a letter addressed to the Royal

Society, of which distinguished body he was elected a Fellow in 1712. Soon after this event he accepted a commission to accompany the Duke of Ormond into Flanders as physician.

THE PRACTITIONER.

In 1713 Freind returned to London, and settled down as a practitioner of medicine of the highest rank.

Everything of a social kind recommended Freind at this time to the favour of the profession and to that of the most influential persons of the outside world, with the exception of a small and powerful circle around the Court. In his day the battle royal between "Whig" and "Tory" divisions of party, two distinctive appellations laid and named just before his time, was keen and intense, and although his position as a Tory influenced his political life, it was harmless to injure him in his professional career. On the 30th of September, 1713, he was admitted as a candidate of the Royal College of Physicians; on the 9th of April, 1716, he was called to the Fellowship; and, becoming one of the great lights of the college, was Gulstonian Lecturer in 1718, Harveian Orator in 1720, and Censor in 1718-19.

Soon after his election to the Fellowship of the Royal College, Freind, resuming his pen as a medical writer classical and practical, published the first and third books of Hippocrates, *De Morbis Popularibus*, to which he added nine short essays or commentaries bearing on fevers. This publication gave rise to a fierce and notable controversy, in which Dr. Woodward, of whom we had some notice in the life of Arbuthnott, took an active part. Woodward was always ready to fight, and he now offered battle on the question of the treatment of fevers, in an essay on the *State of Physic and of Diseases, with an enquiry into the causes of the late increase of them, but more particularly of the Small-pox*. To Woodward, personally, Freind would not condescend to reply; for Woodward, although of undoubted worth, talent, and honesty, was, as we have seen in the lives both of Mead and Arbuthnott, a man whom we should in these days consider as one "boycotted" by his fellows, and this without his seeming to have done anything wrong in any way whatever. In plain words, he was an original weak man; too original to stand with the crowd, too weak to stand by himself, but too anxious to consort with the recognised elect, to whom he was always offering his allegiance, and always getting what he might be sure to expect from

them. To a proud man like Freind such a man as Woodward, whatever his genius, would be a mere foil, to be played at anonymously and made a fool of; or hit at by side-blows, a mode of warfare common to the high and mighty, by which they retain and maintain their own pride if they do nothing more. To Woodward Freind replied in this form. He wrote a letter to Dr. Mead concerning the advantage of purging in the second fever of the confluent small-pox; and under the assumed name of Dr. Byfield he addressed a letter "To the Learned Dr. Woodward," in which, to use the words of one of his early biographers, "he rallied Woodward with great spirit and address, making no serious answer to Woodward's book, but contenting himself with ridiculing his antagonist under the name of a celebrated empiric."

To us in this day the quarrel, altogether out of date, involves a point of practice in which we have little interest, the treatment of confluent small-pox by purgatives being now removed very far from the field of serious argument. But in the days of Freind the treatment of small-pox was one of the vital questions of practical medicine, and whether to cleanse the body of the pestilent humours that infected it by recourse to free purgation, or whether to let Nature herself evacuate the humours, was considered second to no other question in the whole domain of practice. The question was never satisfactorily settled. We read of it cropping up again and again, to the time of Dr. Gregory, who, referring to the very dispute between Freind and Woodward, observes:

"One of the most remarkable disputes in physic was that regarding the propriety of using purgatives during the secondary fever of small-pox. Sydenham, with all his boldness, never wholly divested himself of the early prejudices which the Arabians had inculcated against purgatives in small-pox. Morton inveighed bitterly against their use, while Dr. Freind, with the true spirit of a reformer, advocated their free employment, especially during the secondary fever. They are now as freely employed in the secondary fever of small-pox as in ague or in typhus. They are of the greatest service when the skin is hot and dry, when a scarlatinal rash covers the body, or innumerable abscesses give evidence of the excited state of the cutaneous vessels."

Mead took the same side as Freind on the vexed question of purgation in the secondary fever of small-pox, but appears to have been unwilling to attach any specific value to mercury; on which medicine another battle was fought, which ended in the curious

discovery that, although free dilution of small-pox virus with water did not destroy its infectious properties, the addition of calomel to it did.

THE POLITICIAN AND HISTORIAN.

We are now brought to a new and important phase in the life of Freind, during which he appears in a fresh character, namely, as a political prisoner and medical historian—a strange combination, and yet one in which he figures naturally and favourably. It will have been inferred that he had always some political leaning of an active kind, and in the year 1722 he gave way to this so far as to stand as member of Parliament for Launceston, in Cornwall, for which borough he was duly returned in the Tory interest. In the Commons he soon distinguished himself by the smartness of his speech and the freedom of his expression against any measure of which he did not approve and which he thought called for observation; so that amongst his opponents he became a marked man, and amongst his friends a man of mark, and that too in stormy days when the spirit of the whole nation was worked into fury by the failure of the great "South Sea bubble," and by the distress incident to that gigantic fraud on people whose cupidity was, in truth, the heart of the transaction, and who deserved pretty well all that they got. But the people themselves, blind to their own faults, and believing that the foul cheat must lie with some of the political chiefs, vented their wrath on a few suspects. Amongst these the Bishop of Rochester, Bishop Atterbury, was the most, or one of the most, signalled, and what was called the Atterbury plot was submitted to scrutiny. The Bishop, an able and energetic man and a bold and skilful leader of his party, was arrested; his papers were seized, and he, with the Duke of Norfolk, the Earl of Orrery, Lord North, and Lord Grey, were confined to the Tower with some other supposed offenders, including Freind, who as physician to the Bishop, and in student days a college associate—one of the "Bees," and conjoint author of an attack on Bentley—as well as a Tory M.P., fell an easy prey at a time when popular feeling was so excited and the great safeguard of English liberty, the Habeas Corpus Act, was suspended. After an examination before a committee of the Privy Council he was committed, with the rest, to the Tower, and remained a prisoner there from March 17th, 1722-3, until June 21st of that memorable year.

And now we must stop for a short time to see our learned doctor in the seclusion of the prison, waiting for the turn of the wheel of

fortune for good or for evil. His life probably was never in danger, and his creature comforts must have been fairly looked after, because he himself conveys to us that the most he had to complain of was an enforced leisure. To fill up the void thus occasioned he must once more have resort to the pen, and compose another letter to Dr. Mead on *A Particular Kind of Small Pox*. The letter was not a long task, and when it was finished necessity called for a new and more elaborate occupation. "There is no virtue like necessity."

THE HISTORY OF MEDICINE.

The task that now was entered into was in every sense congenial to his position, his tastes, and his learning. He tells us that the work was written only to pass away a few leisure hours, and without any design of making it public; afterwards he was persuaded to review it, and make some additions as he found occasion. He adds that "if this short history of physic can be of any use or entertainment to those who are versed in the Ancients, or can excite others to be better acquainted with them, he will think his labour very well employed; or if it should not, he shall not be dissatisfied with having amused himself in this way."

Starting on the excellent and independent basis thus quoted, the only sound basis of every independent work, Freind opens his treatise in the form of a letter to Dr. Mead, and defines the intention and scope of the labour before him. He refers to the famous *History of Physic* by the great scholar Le Clerc, in which work the history is brought down to the end of the time of Galen. In Le Clerc he finds, amply and clearly represented, all the philosophy, the theory, and practice of the ancient physicians, so that there is "scarce a notion, a distemper, a medicine, or even the name of an author to be met with amongst them of which there is not given a full and exact account."

But about the latest edition of Le Clerc which had passed into the hands of Freind there was a shortcoming. In this edition there was included a plan which should serve for a continuation of the history down to the middle of the seventeenth century, a space of one thousand two hundred years, and too large to be well explained in so brief a sketch, though he had filled half of it with relating "all the obscure jargon and nonsense of that illiterate enthusiast Paracelsus." The addition, for this reason, was very unsatisfactory; it was an imperfect and superficial performance, and it had the further fault

that it was incorrect in respect to dates. For instance, Le Clerc placed Oribasius, Aetius, Alexander, and Paulus, without any distinction, in the fourth century; but Oribasius wrote his collections in the time of Julian, about 360, though he lived till the end of the fourth century. Aetius did not write till the very end of the fifth or the beginning of the sixth century, as his own works prove. Alexander flourished later than Aetius, in the reign of Justinian. And Paulus was later still, since he mentions Alexander, and was himself referred to by Abulphragius, the Arabian, who places him in the reign of Heraclius, about the year 621, just before the Caliphate of Othman, which began in 643, two years after the death of Heraclius. A still greater mistake is brought against Le Clerc in respect to Diocles Carystius, who has been called the second Hippocrates, and who lived three hundred years B.C., but who, according to Le Clerc, lived eighty years after Paulus, although Paulus himself quotes a letter written by Diocles to Antigonus.

To supply the void left by Le Clerc, and put the history right in the matter of dates, Freind reviews afresh the lives and works of the four authors Oribasius, Aetius, Alexander, and Paulus, with some other histories and comments which will call for our attention. The work, which was published in two parts, the first in 1725, the second in 1726, was not, at once, well received on all sides. It met with some envious criticism at home, but with the most hostile abroad, from Daniel Le Clerc, the brother of the Historian of Physic up to the time of Galen. Freind had spoken in the highest terms of admiration of the first portion of John Le Clerc's labours, but considered that the fragment dealing with the time after Galen was most imperfect and incorrect; hence his own treatise. To this Daniel Le Clerc responded that Freind had misinterpreted his brother's object and intention, which was to supply, simply, a rough draft which might be of service to any one who would undertake a more elaborate exposition.

After correcting the dates which were given by Le Clerc, Freind proceeds to narrate the lives and works of the four authors above specified in some detail. He commences with Oribasius, who deserves the name given him, of Simia Galeni. Of Oribasius he records that his anatomy is taken mainly from Galen, but that he is originally signalised by being the first to describe the salivary glands, as in the following words: "On each side of the tongue lie the orifices of the vessels which discharge the spittle, and into which you may put a probe. These vessels take their rise from the root of the

tongue, where the glands are situated. They arise from these glands in much such a manner as arteries usually do, and convey the salivary liquor which moistens the tongue and all the adjacent parts of the mouth."

Oribasius is also credited with being the first to describe a strange species of melancholy and madness, which he thus explains: "The persons affected go out of their houses in the night time, and in everything imitate wolves, and wander among the sepulchres of the dead until daybreak. You may know them by these symptoms. Their looks are pale; their eyes are heavy, dull, and dry, without the least moisture of a tear; their tongue is exceedingly parched and dry; no spittle in the mouth; extreme thirst; their legs, from the falls and bruises they receive, are full of incurable sores and ulcers." The Greeks called this disease *Lucanthropia*, after the wolf, or wolf-madness; and Freind, after naming other authors amongst the ancients who had described the disease, relates that some living near to his own time, for example Donatus and Forestus, had also recognised it.

Oribasius was a man of the highest mark. He was born at Pergamus, and was educated in the school of Zeno the Cyprian, at Sardes. He then moved to Alexandria, where he became a famous professor; helped the Emperor Julian to the Empire; was, in return, made *Quæstor* of Constantinople; fell into disgrace under the next Emperor; was banished and delivered into the hands of the barbarians, but cured them of their diseases with such skill that they adored him as a god. Hence he was recalled to place and power, and, at his death, left behind him seventy-two volumes of collected works.

Of his next author, Aetius, Freind speaks with great admiration. Aetius, following *Æsclepiades*, treated *anasarca* by incisions in the lower limbs, in the scrotum, and in other parts of the body. He made free use of issues, and in the case of a bite from a mad dog advised that the issues should be kept open forty or even sixty days, and if they closed should be opened again. He was also the first, from Leonides, who gave an account of the *Dracunculi*, a sort of worms, sometimes large, sometimes small, which breed most frequently in the thighs, but now and then in the muscular parts of the arm. These worms move under the skin without giving any pain. But, in time, the place suppurates about the extremity of the worm; the skin opens, and the head of the animal appears. Care must be taken to let the worm come out entirely of itself, or by the help of a string

or incision ; for if it break, and part of it be left behind, it occasions exquisite pain.

Aetius was born in Amida, in Mesopotamia ; studied at Alexandria, and was probably a Christian. He is sometimes named as one of the chief officers who went before the emperor as his harbinger. He was great on Egyptian pharmacy and nostrums, and it seems, says Freind, "to have been his design to show us how little there is in such recipes when they are once made public, whatever pompous names they might bear or however much soever they were in vogue. A man who has the least acquaintance with medicine must be sensible that any universal remedy must be a cheat." Aetius was great on gout, but, like a good many moderns, proposed rules for cure which were worse to bear than the disease itself. In one example the process of cure, through a strict and peculiar regimen, lasted the whole of a year.

On the physician Alexander, commonly known in his own day as "Alexander the Physician," Freind expends much admiration. Alexander was born at Tralles, his father, Stephanus, being of the profession of medicine. He was most esteemed for his therapeutical learning, and had a knowledge, considered to be of the highest order, of the use of purgatives, of emetics, of blisters, and of blood-letting. He was conversant with the disease of the lung called tubercle, and relates an instance of one who coughed up a calculus, like a real stone, smooth, hard, and making a noise if it were dropped on the ground. Of the value of water as an aliment, Alexander possessed a most acute and singular knowledge. He says that though water be looked on by some as having no powers of nourishment, because it is a simple body, yet it is the means of nourishing everything ; it conveys the aliments into the body and unites the divided particles. For if water joins together the dry and disunited parts of the earth, and gives it a continuity, so as different vessels may be formed out of it ; if it makes the very bread we eat ; and if it is the main instrument of generation, both in the animal and vegetable world, it is highly reasonable to think that it performs the same offices in the human body.

Reasoning from these premises, it was the practice of Alexander of Tralles to administer all medicines, in fevers, with a free quantity of water : "a practice," says Freind, "which is not only consistent with his own notions, but surely founded upon very good reason."

For the relief of hiccough Alexander recommends some kind of mental diversion, such as the counting of money ; and amongst

common and useful remedies, remaining in use even up to our day, he mentions, for the first time in medicine, our old familiar and much-valued friend rhubarb. To him rhubarb was a remedy in weakness of the liver and dysentery. He was also acquainted with steel as a medicine, recommending it in what he designates schirrus of the spleen. Writing to Theodorus on the subject of worms in the intestinal canal, and in reference to a child of Theodorus supposed to be suffering from that cause of disease, he shows a most advanced knowledge. He describes clearly the three species of worms—the little slender ascarides, the round worm, and the broad worm or *tænia*. Of the last he had seen one nearly sixteen feet long. From some of the recipes given by Alexander, Freind considers that he was either a Christian or a Jew; and as he professes a belief in charms for demoniacs, consisting of words taken from the Scriptures, he thinks he must have been a Christian, since the Christians seem to have introduced that custom.

In commenting on Alexander, Freind discusses the disputed point whether he belonged to the Methodists, and decides at last rather against that supposition. He also introduces us to various of the cotemporaries and followers of the illustrious Trallien; and coming to Procopius, who wrote in the time of Justinian, he inclines to the view that this distinguished scholar and figure in history belonged also to the fraternity of physic. He bases this theory on some passages in the works of Procopius, wherein that historian treats on medical men and medical subjects in terms which seem to betray a skill and knowledge which nothing short of a professional training could permit. The passages, at least, are sufficient to show that the writer had a tincture of the profession when he was young, before he was employed in civil affairs; for he uses the very words and phrases which are familiar with the physical writers, and has described one distemper, the plague which raged in Constantinople in 543, with as much art and exactness, and as much in the language of physic, as if he had been a professed physician.

From Alexander, Freind passes to Paulus, and treats of him in the same learned style. Paulus lived in the seventh century, and, although a compiler, was very different from Oribasius and Aetius. Paulus transcribed a great deal from Alexander, not only in the sense, but in the words. He was born in the island of Ægina, was a great traveller, and had opportunities of seeing much practice in different countries. His descriptions of diseases are short and full,

and "how great a copier soever he be, one thing is remarkable of him, that he treats particularly of women's distempers, and seems to be the first instance upon record of a professed man-midwife, for so he was called by the Arabians; and, accordingly, he begins his book with diseases incident to pregnant women."

With much care Freind describes the surgery of Paulus: how he operated for stone and for hernia; how he drew blood by the arteries, and how he understood the nature and treatment of arterial aneurism. But the most interesting passage of all is one where he describes the operation which in these days we call tracheotomy, following, in this matter, Antyllus, who may be considered the originator of the operation, and who thought upon this way of cutting, by observing that when it—the windpipe—was cut by chance, the air rushed through it with great violence, and the voice was interrupted. The mode of operating adopted by Antyllus was elementary enough. "The head of the patient was thrown back, that the windpipe might be brought forward to the full view, and a transverse section was made between two of the rings of the windpipe, so that not the cartilage, but the membrane which encloses and unites the cartilages together was divided. If the operator be a little fearful, he may first divide the skin, extended by a hook; then, proceeding to the pipe and separating the vessels, he may make the incision." It will be observed that in this description no mention is made of the use of a tube, that very little is said about the dissection of parts, and nothing about the treatment of the thyroid gland if that should interfere; so that the operation is obviously described from a limited practice of it. But it may be observed that the plan of making a transverse incision through the skin is, perhaps, still the best: it causes the trachea to be fully exposed, by allowing a free escape of blood by the angles of the wound it prevents hæmorrhage into the windpipe, and it leaves a small and clean wound.

With the history of the four standard Greek writers, Oribasius, Aetius, Alexander, and Paulus, Freind brings the major part of his work to a close. He hesitates a short time, however, in order to touch on two or three remarkable incidents which seem to have given him considerable perplexity. Amongst these he specially refers to the writings of Nemesius, Bishop of Emissa, who, in a treatise on the *Nature of Man*, written near the close of the fourth century, has stated two physiological propositions which certainly are, even to the present day, subjects of wonder. In the

first of these Nemesius refers to the bile and its uses in the animal economy. The bile, he says, helps digestion and contributes to the expulsion of the excrements, and therefore it is, in a manner, one of the nourishing powers: besides, as a vital faculty, it imparts a sort of heat to the body. And, for these reasons, it seems to be made for itself; but, because it purges the blood, it seems to be formed for the sake of the blood. In these ideas Nemesius anticipated Sylvius de Boe. But, adds Freind, there follows a much more material point—namely, that it has been attributed to Nemesius that he was acquainted with the circulation of the blood, and describes it in the following passage. “The motion of the pulse takes its rise from the heart, and chiefly from the left ventricle of it; the artery is, with great vehemence, dilated and contracted by a sort of constant harmony and order. While it is dilated, it draws the thinner part of the blood from the next veins, the exhalation or vapour of which blood is made the aliment for the vital spirit. But while it is contracted it exhales whatever fumes it has through the whole body, and by secret passages. So that the heart throws out whatever is fuliginous through the mouth and the nose by expiration.”

As a matter of course, Freind enters into a full defence of the Harveian discovery, and calls up, in order to dispose of them, the counter-claims that have been made for Servetus, Columbus, and Cæsalpinus. Into this argument he also brings Ambrose Paré, who tied up bleeding arteries before the circulation of the blood through them was known. These are truths which must not be ignored; but they detract not the least from the glory of our Harvey and his comprehensive induction. Nay, it may be questioned whether the practice of Paré himself would have been so much in vogue, did not the doctrine of the circulation convince men of the usefulness of it.

Pursuing his theme, and dealing with the minor masters, Freind discovers a great gap in medical history, extending from the year A.D. 560 to the reign of Isaac Comnenus in 1060, a “chasm of five hundred years.” In this long space he notices Palladius of Alexandria, called sometimes the Sophist, or Jatrosophist, and the tracts which go under the names of Theophilus and of Stephen, in one of which tracts he discerns the first scientific study of urines. And so he comes down to Actuarius, the son of Zachary, who practised in Constantinople, and who compiled six books for the use of one of the chief officers of the court of the Emperor,

the Lord Chamberlain, who was sent upon an embassy into the north.

Actuarius is remarkable in being quite conversant with the fact that there may be a period of latency in the development of the symptoms after the bite of a rabid animal, a period he once estimated at twelve months, and which some say may be extended to the length of seven years. Actuarius treats likewise on the subject of the palpitation of the heart, but to the surprise of our historian does not offer a word on the small-pox, a disease which the Saracens "first brought in." To Actuarius, Freind gives the credit of first naming the art of distillation, and the mention of distilled liquors in medicine; although he would be inclined to give to Rhazes the practical discovery of distillation. Touching on this topic, he refers to the writings of the Princess Anna Comnena, and of the administration of distilled rosewater to the Emperor Alexius, who died in 1118, and who erected a magnificent hospital for the sick in a new town near the mouth of the Euxine Sea, where one might observe the blind and the lame, as formerly in Solomon's Porch, seeking relief. The building was double, was raised two stories high, and was of such vast extent that an entire view of it could scarcely be taken in one day.

Freind brings to a close his history of physic with some excellent observations on the relationships of experience to knowledge. His words on this matter are so sound I make no apology for transferring them to these pages.

"Experience, without doubt, is a great help to knowledge, and no man of sense can undervalue the advantages of it; but it must not be denied, at the same time, that the word is often made use of where the effects do not so plainly appear. A man may practise, and practise all the days of his life, and yet be never the wiser for his experience, if he neglects to make the proper observations which that experience might suggest to him; and it is not very likely he should be over-nice in his observations who constantly goes on in his first track, and has no other scheme than his own narrow notions in his view; whereas, the searcher of authors has the benefit of other men's experience as well as his own; and it is by the joint concurrence of these that we can hope for any considerable advancement in knowledge. Were it not for this, the oldest practitioner would always be the best physician, and there would be little or no difference, even as to the scientific part, between an old woman and a regular professor."

RELEASE FROM THE TOWER.

The last pages of the history of medicine, still addressed to Dr. Mead, are very touching, and bring us to the concluding portion of the life of their author.

"Only give me leave, sir, to mention what was first in my thoughts when I addressed this discourse to you, and what is now as warm upon my mind as it was then: how sensible I am of your singular friendship, and the general kindness shown to me by the whole faculty, at a time when I was apprehended to be in danger. This I shall always remember with pleasure, and this I think myself obliged, in the most public manner, to acknowledge."

The gratitude above expressed has reference to the way in which Dr. Mead and the other members of the profession of medicine had helped Freind when he was in danger and imprisonment in relation to the Atterbury plot. The story of that help is taken from the pages of the *Gold-Headed Cane*, and runs as follows:—

"When Sir Robert Walpole, the minister of the day, sent to consult Mead on account of an indisposition, he availed himself of the occasion to plead the cause of the captive. He urged that, though the warmth and freedom of Freind might have betrayed him into some intemperate observations, yet no one could doubt his patriotic feelings and loyalty. Finally, the doctor refused to prescribe for the minister unless the prisoner were set at liberty. He was almost immediately released from prison, and admitted to bail, his sureties being Dr. Mead, Dr. Hulse, Dr. Levet, and Dr. Hale." The evening after this event, continues the *Cane*, "there was a numerous assembly at our house at Great Ormond Street, attracted by the hope of seeing Freind. He came, and every one was delighted to meet him once more. When the party broke up, Freind and Arbuthnott were about to take their leave together, as they lived in the same part of the town—the former in Albemarle Street, the latter in Cork Street. Dr. Mead, however, begged Freind to step with him into his own private study, which was a small room adjoining the library. There he presented him with the sum of five thousand guineas, which he had received from his patients whom he had visited during his confinement. On returning to the great room he wished them both 'good night,' and jocosely said to Arbuthnott (who happened to hold the office of Censor to the College that year), 'Now I commit our common friend here to your magisterial

care and guidance : see that he does not again get into trouble ; and on the least appearance of irregularity report him to the President, Sir Hans Sloane. I look to you, Arbuthnott, to preserve harmony amongst us.’”

The most improbable, and indeed the only improbable, statement in this narrative is the amount of fees said to have been collected by Mead from the patients of Freind during the short period, a few months only, that he was in the Tower. It is incredible that in so brief a time Freind’s practice should have yielded five thousand guineas. In explanation it has been suggested that Mead, a truly generous man, may, either himself or assisted by others, have made up the amount to that large sum, and may have presented it as accumulated fees, in order to get Freind to accept it as if it were his just due. For my own part, I am rather inclined to agree with another view, advanced by the distinguished Librarian of the Royal College of Physicians, Dr. Munk—a view in which so great an authority as my friend Dr. Greenhill, of Hastings, also, I think, shares—namely, that in the statement there has been accidentally introduced one 0 too many, and that the sum realised from the practice was 500 instead of 5,000 guineas. Mistakes of a similar kind are constantly taking place in our own more enlightened and accurate day. Why not, therefore, in a day still less particular in regard to such mere details of practice, and of revenue therefrom?

On his release from prison Freind resumed his practice, and was well received by his brethren and by the large circle in which he moved. He continued to hold his seat in Parliament, and in 1725 he presented to the House of Commons a petition from the Royal College of Physicians against the pernicious use of strong spirituous liquors, in which petition the memorialists observe with concern “the fatal effects of the frequent use of several sorts of distilled spirituous liquors upon great numbers of both sexes, rendering them diseased, not fit for business, poor, a burthen to themselves and neighbours, and too often the cause of weak, feeble, and distempered children, who must be, instead of an advantage and strength, a charge to their country.”

In such good works, and indeed in all good and generous works, Freind ever took delight, giving his time and his learning, often in special request, in the most liberal spirit. Thus, in combination with Dr. Atterbury, he composed, in Latin, the epitaph on John Philips,

the poet, in which the lines were introduced comparing Philips to Milton :—

*Uni in hoc laudis genere Miltoño secundus,
Primoque pene par.*

Lines which Dr. Sprat, as Bishop of Rochester, erased, because the word *Miltoño* was, he said, not fit to be in a Christian Church ; but which Atterbury, when he succeeded to the see of Rochester, replaced.

THE END OF THE CHAPTER.

In 1727 Freind was appointed Physician to the Prince of Wales, soon afterwards George II. ; and upon the accession of that king, in June 1727, he was made Physician to the Queen (Caroline), by whom he seems to have been much favoured. He was thus in view of a serene and prosperous career, when he fell a victim to fever in 1728, and died on the 26th of July in that year, in the fifty-third year of his age, leaving as widow, Anne (the eldest daughter of Thomas Morrice, Esq., Paymaster of the Forces in Portugal), to whom he was married in 1709, and one only child, John, who, like his distinguished father, became a scholar of Westminster and of Christ Church, Oxford, but who does not seem to have followed a professional career.

Few men of medicine have left behind them a name bearing deeper respect than John Freind. Bishop Atterbury, in exile, writing of him after hearing the news of his death, said : “ He is honoured by men of all parties at home, and of all countries abroad ; for he was known everywhere, and confessed to be at the head of the Faculty.” Dr. Wigan published his Latin works with a translation of the *History of Medicine*, and with a dedication to the Queen, Caroline, from the pen of Dr. Robert Freind. Keil, Hoffman, Helvetius, Hecquet, and Boerhaave sang his praises abroad. Dr. Edward Wilmot, in his Harveian Oration in 1735, spoke of him as “ a deep philosopher, a learned physician, an elegant writer, and an ornament to society ; very honest, very humane, ever desirous of doing good, and of communicating knowledge to the utmost extent of his power.” Sir George Baker excelled Wilmot in approbation. To the portrait of him by Michael Dahl, a painter of great celebrity, which was left to the Royal College of Physicians by Dr. Matthew Lee, there was an inscription as touching as it was appreciative. A medallion was struck of him, and a splendid monument, with a noble inscription,

was erected to him in Westminster Abbey. In a word, he left all his world in sorrow and respect.

Freind was buried at Hitcham, in Berks, the manor of which he had purchased in 1700, and a slab within the communion rails records—

H. J.
JOHANNES FREIND, M.D.
SERENISSIMÆ REGINÆ CAROLINÆ ARCHIATRUS,
ET HUIUS MANERII DOMINUS,
OBIIT 26 JULII 1728, ÆT. 52.

Mrs. Freind lived until 1737, and was buried by the side of her husband. Their son, John, outlived his mother thirteen years. He died unmarried in the year 1750.

In John Freind we have had before us the pure type of the medical scholar of the historical school of thought. A man who loved books, and who collected a library which was, alone, a good indication of the learning he loved and the labour he represented. It would be false to him to say he was a great and original genius, but he was emphatically what his cotemporary Keil declared him to be, *et scribendi et docendi magistrum*. And in that faith we will leave him to his fame.

Edward Jenner, M.D., F.R.S., a Fortunate Æsculapian

THE question put by Pontius Pilate—"What is truth?" is not less difficult to answer than—"What manner of man was Edward Jenner?" The whole world knows his name, but on what that knowledge is founded few in the world seem correctly to know when the reasons for it are impartially investigated. In my early days I was well acquainted with a practitioner of medicine who was in full practice when Jenner died, and who, in his early life, had "walked" St. Thomas's and Guy's, had studied under Cline, the friend of Jenner, and who, notwithstanding his many advantages for getting information at first hand, had no great opinion either of Jenner or the Jennerian practice. To this man, fair and just in all his ideas about his cotemporaries, and an acute observer, Jenner was a sham, and his methods rather mischievous than beneficial. A little later on I knew another member of our craft of medicine who looked upon Jenner with a reverence it were impossible fully to describe. With this man the very word "Jenner" was magical, carrying with it the idea of science of the highest order, beneficence of heavenly cast, courage, patience, industry, and every human, nay, almost superhuman, virtue.

During the lifetime of Jenner similar differences regarding him and his work existed and were plentifully recorded, and in this more advanced day the same controversy prevails in the worlds of medicine and literature. We take up one of the latest works published on Jenner and Vaccination, and find the whole book, the work and thought of an eminent scholar in medicine, one long argument against the man and his labours. There is no term too hard to use against him, no suggestion against him too strong: he is the old man of the sea mounted on the back of his profession. We lay

down this exposition to take up another, and, lo, the discredited man is ranked immortal, is placed by the side of Æsculapius himself, and is enrolled amongst the number of the gods. What do they say of him in his own place, the place which knew him all his life, in which he was born and bred, died and was buried, the place where he practised medicine over half a century? The puzzle continues even here. It was once my fortune to live for three months, during holiday time, near the scene of his long life. In the time of residence there, I made every inquiry possible as to the opinions which have floated down from friends and neighbours concerning this man. The difference is simply that of light and darkness. Some have heard him spoken of with the utmost contempt, as one who stole or appropriated a common or prevailing notion about arresting disease, and who, full of conceit, selfishness, and vanity, aggrandised to himself fame and wealth by means as common as the mind of man can conceive. Others, on the contrary, report that to their early minds he was presented as the most simple-minded, generous, and unassuming philanthropist that was ever known in the world. On the whole, however, it must in honesty be told, painful as it may be to the medical *amour propre*, the name of Jenner, in Jenner's native air, does not enkindle enthusiasm, as the names of some other men do in their native haunts. The genius of the spot is not reflected by the name, Jenner, like that of Stratford-upon-Avon by Shakespeare, of Penshurst by Sir Philip Sidney, of Wrington by Locke, or of Bedford by Bunyan. The country people of his district talk to this day quite as enthusiastically of Benjamin Jetsy, of Yetminster, who inoculated himself and his family with cow-pox many years before any medical man touched on the subject, namely, in 1774, as the Berkeley people talk of Jenner, and tell, to the memory of their hero, how a portrait of him, by Sharp, was painted in London for the Vaccine Institution, from public subscription, and a tombstone erected, shortly after his death, in 1816, in the churchyard of Worth Matravers, Dorset, on which stone it is stated that he, Jetsy, introduced the cow-pox by inoculation, and "by his great strength of mind made the experiment, from the cow, on his wife and two sons, in the year 1774."

And still in the world at large, in all sections of it, even in the most educated, this war about Edward Jenner wages; nor can we evade this conflict in treating of the man, because there really are grounds for the advocacy on either side. Be it the duty of the present biographer to do justice, blind to every consideration except the truth, the whole truth, and nothing but the truth.

LIFE AND OPPORTUNITIES.

The life of Edward Jenner is in itself one of the simplest and yet the most complex. No man who has made a name so widely known as his name has ever had so plain and centralised a career, and still one so difficult to comprehend as to its character. Jenner was born at Berkeley, in Gloucestershire, on May 17th, 1749, the third son of the vicar of that little place, a clergyman of good family, and possessed also of landed property. In early life he sustained the loss of his father, and was educated at Dr. Washburn's academy in Cirencester, from whence he was sent to Sodbury, near Bristol, to be an articulated pupil, or apprentice, as it was called in the old days, of Mr. Daniel Ludlow, a surgeon of good reputation. This over, he passed to London for hospital practice in 1770, returned to his native place, started in practice there, continued there until his death, on the 26th of January, 1823, and was buried there in the chancel of the parish church on the 3rd of the following February.

The house in which Jenner lived stands, almost unchanged, hard by the demolished vicarage in which he was born. The visitor can see the room in which he studied, the room in which he died, the room outside which probably acted as his surgery; the wooden house in the garden in which, according to tradition, he kept his cows, and in which he would sometimes practise cow-pox inoculation; and the garden in which, according also to tradition, he passed a great deal of his time when he was not employed in practical or other pursuits. Taking it altogether, it is a pretty, modest little residence, just such a residence as a simple-minded, industrious, studious soul would love to occupy and rarely care to leave. The house speaks well for Jenner. Here haply might be said of him, if all were clear:—

“Far from the madding crowd's ignoble strife
His sober wishes never learn'd to stray,
Along the cool sequester'd vale of life
He kept the noiseless tenor of his way.”

And yet, out of that cool sequestered vale, he made as much noise as any Englishman who ever obtained renown, his cotemporary Arthur, Duke of Wellington not excepted.

A great deal has been made of the remarkable opportunities of Jenner in his early years, but some of this is mere rhapsody. He had small means; his first passage into medicine was through the house and home of a most respectable general practitioner of

medicine, always a first-rate start, and so far he did well, but not better than the majority of his compeers. Then he came to London to walk the hospital of St. George, and to remain, for two years, the pupil of the famous John Hunter, one of the surgeons, at that time, to the hospital, and founder of the grand museum which bears his name. Those who have gone into extremes about the genius of Jenner have certainly made the most of this part of his career. They compare him with his master, and suggest that the master saw in the pupil the forecast of astounding talent. We must take such estimates *cum grano*. The correspondence between Hunter and Jenner conveys no such ideal. It is true that Jenner worked for Hunter; it is true that Hunter recommended him to Sir Joseph Banks to prepare and arrange the various treasures of natural history which had been brought to England by the famous Captain Cook in the year 1771; and it is also said—although this is doubtful—that an invitation was extended to Jenner to accompany Cook as naturalist during his next voyage, to be undertaken in the year 1773; but there is nothing in these statements that gives any very remarkable pre-eminence to the student, or that indicates his possession of special learning or genius. Jenner, in short, by good fortune, became the pupil of John Hunter, not because Hunter found him out, but because he, or some friend for him, found out Hunter; and, being so fortunately placed, nothing could be more natural than that he should assist in work of natural history. In those days young medical men trained even for a few months in natural history were so rare that every one of them was seized for work, and a pupil of the greatest anatomist of the day, whoever he might be, would be sure soon to have an engagement, presuming that he were of respectable family and that his moral character were good, both of which advantages our student held in a high degree. We need not, therefore, go wild about the early genius of Jenner as a naturalist because of his early labours on the specimens brought home by Cook under the direction of Banks and Solander. We must, in strict search for the truth, the whole truth, and nothing but the truth, admit with some sorrow that the balance of evidence lies the other way. A youth of genius, filled with the enthusiastic zeal natural to genius for original research, would have hailed the opportunity of becoming a fellow-traveller and fellow-worker with the greatest navigator the world at that time knew, a second Columbus; and would have rejoiced that he was able to “go down to the sea in ships” and to “do business in great waters”; and if Jenner had no such noble ambition, so much the worse for



EDWARD JENNER, M.D., F.R.S.



the proofs of his genius and his courage. Essentially a home bird, he preferred to return as soon as he possibly could to his native solitudes, and there follow out, amongst genial companions, the quiet life and pursuits of a country surgeon, the good friend of all around him, and in time the friend of the merry members of two clubs, the *Medico Convivial Club*, which met at an inn that still stands and is still connected with his name as one of its famous visitors, the Bear Inn, Rodborough; and the *Convivio Medical Club*, which met at the Ship at Alveston. In both clubs he sometimes was voted prosy, and, not to put too fine a point on it, was so much of a bore that he almost got his *cong  * as a member.

Commencing practice in the house of his brother, the Rev. Stephen Jenner, in 1772, he showed himself at once to be a popular practitioner of medicine, and, apart from his professional labours, he helped Hunter by making observations for him, conducting some experiments, and procuring him specimens. The fact of this service is written clearly enough, as letters of Hunter to Jenner show, but it must be carefully guarded from error of enthusiasm. Hunter was, unquestionably, fond of Jenner, had for him a personal liking, a liking of the master for the pupil, but in no sense a liking of fellowship, or of admiration as for a compeer. All great teachers have, from time immemorial, had favourite pupils of the same cast, men whom they could invite to work for them, and with whom they were familiar, but whom they never thought of admitting as their equals in name and fame; and so Jenner stood to Hunter. The correspondence is evidence unmistakable on this point. The letters of the master are warm and friendly letters of trust and confidence, nay, letters of gratitude in some respects, but they are always the letters of the master. "I have one order to send you, which is to send everything you can get, either animal, vegetable, or mineral." In some cases there are directions for experiments, the results of which do not readily appear. There are, from Hunter, gentle upbraidings that time is being lost in carrying out inquiries; and, once at least, there is indication that Master John, so clever in all manipulative acts, and so well trained in the workrooms of his brother William Hunter, was not particularly struck by the abilities of his Gloucestershire pupil. The pupil has received a thermometer from his master, and having, it is to be inferred, broken the instrument, has written for another; to which request he receives as reply: "You are very sly, although you think I cannot see it; you very

modestly ask for a thermometer. I will send one, but take care those d—d clumsy fingers do not break it also." Not much compliment to Jenner's mechanical genius here. More than that, if we read the correspondence without bias, and without being charged with the preconception that Jenner was a born genius destined, or predestined, to immortal fame, and that Hunter knew the fact by virtue of some prescience peculiar to himself, we are forced to gather from it that blunt and industrious John Hunter, with all his personal likings for his country pupil, had a considerable distaste for the habits of procrastination and indolence in which that pupil indulged. If after Hunter's death nothing more had been heard of Jenner except by the letters that passed between the two, we should either find no notice of Jenner, or should, at best, be content to report that he received certain letters from the great anatomist in which he was called to book for being very slow in his researches, even in simple matters of observation, clumsy-fingered in the use of instruments of precision, and requiring a great deal of stimulation. Thus, after giving a number of commands, and telling his disciple to "be as particular as you can," Hunter adds, "There is employment for you, young man," a sentence which shows the terms on which the two stood, one to the other, far better than any longer exposition.

At the same time there is a circumstance which lends a colour to the hypothesis that Hunter, and some of those with whom Jenner held communion whilst in London, formed a fair opinion of his scientific qualities. In 1786 he forwarded a paper to the Royal Society, through Hunter, on the *Natural History of the Cuckoo*. It was in the form of a letter to Hunter, and it may be considered as a result of a number of private communications on the subject between them, extending from the period when their acquaintance first began. The master was, at that time, making dissections of the cuckoo, trying to discover, from its anatomy, why the strange bird should lay its eggs in other birds' nests, and allow them to be hatched by strangers. He had pressed on Jenner to inquire further into the subject, and now the suggestion had been carried out, and the paper, as a letter, was despatched. The recommendation of Hunter would be alone sufficient to introduce the communication to the Royal Society, but a long and rather inexplicable delay occurred before it reached its destination, indicating that Hunter was either neglectful or doubtful about it; most likely he was doubtful, for he made a kind of apology, as if some misunderstandings or wranglings in the

Society had caused postponement of the reception or the publication of it. At last, in the middle of the following year, 1787, probably in June, the paper came before the Society, and received the coveted honour of an order from the Council that it should be printed in the *Transactions*. At Jenner's own request it was not then printed: he asked that it might be sent back to him for correction or emendation; and Sir Joseph Banks, the then "mighty President," as he was called, was gracious enough to pen the country doctor a letter, telling him that what he wanted should be done, and that the paper might come back for publication the next year in the amended form. It came back, was read on March 13th, 1788, and seems to have been well received, for upon it Jenner was proposed for the Fellowship, and was elected at the February meeting in 1789.

Respecting the merits of this paper on the cuckoo, the most diverse views have been advanced. The admirers of its author have lauded it as something quite out of the ordinary lines of natural research. Those who have not admired him have looked on the effort as commonplace itself. Both views appear to be wrong and extreme. The paper is not great, neither is it contemptible. In it we get a simple explanation of a fact which other men engaged in studying the habits of the cuckoo had observed, but had not explained. Jenner confirmed what Hunter had suggested, that the cuckoo lays a number of eggs and deposits them one by one in the nests of different birds. He noticed also the size of the eggs, and compared them with those of other birds of similar size to the cuckoo, and he speculated on the reasons why the bird left its eggs to the mercy of birds of a different kind. This was in his paper as it was originally written, but he recalled it in order to add a new observation as to the reason why the natural young of the foster-bird were expelled the nest when the young cuckoo was in possession. In a nest of a hedge-sparrow he had seen the process of expulsion, and discovered the fact that the deed was done by the young cuckoo—not by the mother-bird—which, with consummate tact and courage, kicked out, so to say, the natural occupants, eggs and baby hedge-sparrows, and made itself master of all that it surveyed. He teased the tiny marauder by putting other things into the nest, and witnessed its attacks on the intruding object; and, taking everything he had seen into consideration, he put together a pleasant and rather original series of details so as to form an ingenious and interesting, though short, essay, perhaps one of the least remarkable communica-

tions which up to that time had won the envied three letters in the titular alphabet of science. But it must be remembered that Edward Jenner was John Hunter's favourite pupil, to some extent the friend of the "mighty President" of the Society, of Mrs. Hunter's brother, Everard Home, and of Cline, to say nothing of the close acquaintanceship of many others, and that he had the advantage of being a country surgeon, removed far away from cliques and cabals, and not likely, therefore, to be at war with the members of the council chamber or meeting room.

During the period when the paper to the Royal Society was in progress, Jenner was engaged in another and very different pursuit. Some time previously he had been in love with a fair damsel who, as it would appear, jilted him, and whose faithlessness he felt so deeply that he wrote about the event to John Hunter, who gave him the advice not to mind, but to let the fickle one go, and find hope and consolation in the study of hedgehogs for him, John the anatomist. Now he was more fortunate, for in 1788 he became united in marriage with Miss Catherine Kingscote, a lady of his own rank in life, of gentle and sympathising nature, who to this day is spoken of with affection, admiration, and respect. My much-regretted friend, the late Mr. T. T. Bridgman, of Berkeley, who knew the Jennerian history better than any man I ever met, and with whom, in 1884, I spent some delightful hours in Berkeley, told me that he had known many persons who recollected Mrs. Jenner, and that there was but one voice respecting her, and that in warm appreciation of her virtues and gentleness. Let it also be related in this place that, apart altogether from his position as a discoverer, Jenner was considered, by those who shared his friendship, to be a genial, kind, and well-disposed man, a good practitioner, and, in private life, a merry and congenial companion, with some readiness of wit, and with a certain measure of humour which he could agreeably put forth. At the *Medico Convivial* and the *Convivio Medical Clubs* he was, perhaps, rather sat upon, at times, but his good-nature saved him at first, and afterwards his rising celebrity was alone a sufficient protection. He had musical tastes, also, in some degree, could sing a merry song, and could play a little on the flute and the violin; he could also tell a story; and, at times, he dabbled in poetry, having, without doubt, "a rhyming soul." He belonged to a "catch club," and was good at a "catch" verse; as witness the following sent to a lady whose daughter had been under his care, and had been

restored to health. The verse was accompanied with a present of a couple of ducks.

“I’ve despatched, my dear madam, this scrap of a letter,
To say that Miss * * * * is very much better ;
A regular doctor she no longer lacks,
And therefore I’ve sent her a couple of quacks.”

That the word “lacks” is out of place in this doggerel is possible, and that the whole is childish is plain enough ; but it is just to remember that, as it was never expected by the writer of the lines that they should pass down to posterity, they ought to be excused as evidence of poetic skill. Two other effusions of a poetical character were written by Jenner, to which more importance has been attached, and which, for the sake of poetasters in general, are here added :—

ADDRESS TO A ROBIN.

“Come, sweetest of the feather’d throng,
And soothe me with thy plaintive song ;
Come to my cot, devoid of fear,
No danger shall await you here.
No prowling cat, with whisker’d face,
Approaches this sequester’d place ;
No schoolboy, with his willow-bow,
Shall aim at thee a murder’ous blow ;
No wily limed twig e’er molest
Thy olive wing or crimson breast.
Thy cup, sweet bird ! I’ll duly fill
At yonder cressy, bubbling rill ;
Thy board shall plenteously be spread
With crumblets of the nicest bread ;
And when rude winter comes, and shows
Her icicles and shiv’ring snows,
Hop o’er my cheering hearth and be
One of my peaceful family ;
Then soothe me with thy plaintive song,
Thou sweetest of the feather’d throng !”

SIGNS OF RAIN.

*An Excuse for not accepting the Invitation of a Friend to make a
Country Excursion.*

“The hollow winds begin to blow,
The clouds look black, the glass is low,
The soot falls down, the spaniels sleep,
And spiders from their cobwebs creep.
Last night the sun went pale to bed,
The moon in halos hid her head.

The boding shepherd heaves a sigh,
 For see ! a rainbow spans the sky.
 The walls are damp, the ditches smell,
 Closed is the pink-eyed pimpernel.
 Hark ! how the chairs and tables crack ;
 Old Betty's joints are on the rack.
 Loud quack the ducks, the peacocks cry,
 The distant hills are looking nigh.
 How restless are the snorting swine !
 The busy flies disturb the kine.
 Low o'er the grass the swallow wings ;
 The cricket, too, how loud it sings !
 Puss, on the hearth, with velvet paws
 Sits smoothing o'er her whisker'd jaws.
 Through the clear stream the fishes rise,
 And nimbly catch th' incautious flies ;
 The sheep were seen, at early light,
 Cropping the meads with eager bite.
 Though June, the air is cold and chill ;
 The mellow blackbird's voice is still.
 The glowworms, numerous and bright,
 Illum'd the dewy hill last night ;
 At dusk the squalid toad was seen,
 Hopping and crawling, o'er the green.
 The frog has lost his yellow vest,
 And in a dingy suit is dress'd.
 The leech, disturbed, is newly risen
 Quite to the summit of his prison.
 The whirling winds the dust obeys,
 And in the rapid eddy plays.
 My dog, so alter'd in his taste,
 Quits mutton-bones, on grass to feast ;
 And see yon rooks, how odd their flight !
 They imitate the gliding kite ;
 Or seem precipitate to fall,
 As if they felt the piercing ball.
 'Twill surely rain—I see with sorrow
 Our jaunt must be put off to-morrow."

The *Robin* is not wanting in a certain quality of simple sweetness ; and the other song, on the *Signs of Rain*, more closely descriptive, was in days long gone by a famous popular recitation. The theme is an old one, and unfortunately for Jenner a greater Æsculapian than he ran before him in the same strain ; but if he fails to reach the music of the first Georgic he may readily be forgiven.

To common observation Jenner was not an ambitious man. His friendly critics greatly commend his modesty. John Hunter, wishing

to establish a school of anatomy and natural history in London, asked Jenner to advance a thousand pounds towards the project, and to take a share with himself in the work. Jenner declined. Was this, say his friends, ambition? Cline urged him to settle in London, and assured him that a practice of ten thousand pounds a year would follow the venture. Jenner replies, "Shall I, who in the morning of my days sought the lowly and sequestered paths of life, the valley, not the mountain—shall I, now my evening is fast approaching, hold myself up for fortune and for fame?" Is this, say his friends, ambition? It looks the absolute opposite. Yet it is difficult to get at the truth, for in the position he held "in the valley" he had, in reality, everything he could desire. Perhaps he was not ambitious, but, as his foes say, only vain; and that he was vain is indicated by numerous little foibles, such as the giving away of locks of his hair, and making sentimental confidences and observations respecting his work and its results, which certainly neither exhibit greatness of mind nor a noble ambition. He first entrusted what many have considered the grand secret of cow-pox inoculation, as something of essential benefit to the human race, not to his medical friends, but to one Gardner, a vintner, because "Gardner will not talk about it," and because if anything untoward turns up in the course of experiment, he (Jenner) "will be made, particularly by his medical brethren, a subject of ridicule, for he is the mark they all shoot at." Again, there often fell from him expressions of humility which grate on the independent mind. The celebrated preacher, Rowland Hill, introduces him to a nobleman in these words: "Allow me to present to your lordship my friend Dr. Jenner, who has been the means of saving more lives than any other man." "Ah," responds Jenner, "would I, like you, could say souls!" His last expressions convey a similar strange humility. "I do not marvel that men are grateful to me, but I am surprised that they do not feel gratitude to God for making me a medium of good." There are some who may not admire these characteristics; there are many, there have been many, who do admire them; there are a still larger number who look upon them as the mere foibles of a man powerful as well as famous. It is fairest, as it is most gracious and pleasant, to think of them as indicating an unsophisticated and guileless man who said what he felt at the moment with thoughtless candour; who had been egregiously flattered; and who was so unconscious of any misinterpretation, that all he spoke went out of his memory so soon as it was spoken. Certain it is that his domestic

life, which is one of the best tests of simplicity and purity, was unquestioned and of unqualified good repute. His children, two sons and one daughter, were, with his wife and his other relations, all in all to him and he to them. The local tradition respecting the Jenner family, Mr. Bridgman told me, was universally to the effect that they were exemplary in their domestic life and in their domestic affection. The one pastime which Jenner most disliked, and which, it is said, he would not permit in his family circle, was cards. He did not particularly favour dancing, but would occasionally join in a dance. He was a good rider, and did most of his professional journeys on horseback. His personal appearance in the active period of his life was described to his biographer Baron, by a friend, as follows:—"His height was under the middle size; his person was robust, but active and well formed. In his dress he was peculiarly neat, and everything about him showed the man intent and serious, and well prepared to meet the duties of his calling. When I first saw him it was on Frampton Green. I was somewhat his junior in years, and had heard so much of Mr. Jenner of Berkeley that I had no small curiosity to see him. He was dressed in a blue coat and yellow buttons, buckskins, well-polished jockey boots with handsome silver spurs, and he carried a smart whip with a silver handle. His hair, after the fashion of the times, was done up in a club, and he wore a broad-brimmed hat." "We were introduced," continues the narrator, "on that occasion, and I was delighted and astonished. I was prepared to find an accomplished man, and all the country spoke of him as a skilful surgeon and a great naturalist; but I did not expect to find him so much at home on other matters. I, who had been spending my time in cultivating my judgment by abstract study, and, smit from my boyhood with the love of song, had sought my amusement in the rosy fields of imagination, was not less surprised than gratified to find that the ancient affinity between Apollo and Æsculapius was so well maintained in his person." Some years later, the late Mr. T. J. Pettigrew, F.R.S., whom I had the pleasure once to meet, was introduced to Jenner by Dr. Lettsom, and he has confirmed all that Baron has said as to the personal characteristics of Jenner.*

* Pettigrew was wont to tell, with much spirit, that it was he who had the honour of vaccinating the Princess Victoria, our present Queen. He was also great on the subject of mummies, on which he wrote a truly learned work. It was of him that Mr. Punch, in the days of his youth (if Mr. Punch ever was young), penned the witty classical pun:—

Crescit amor mummi, quantum ipse Pettigrew crescit.

THE MAN OF PHYSIC AND SCIENCE.

Familiar, to some extent, with the Jenner of social life and quality, we may turn next to him for a page or so as the Jenner of physic and science. What is he in these departments? In medicine, he ranked from beginning to end as a general practitioner; and although for a short time in the years 1804-5 he was induced to leave "the valley" and settle himself in Hertford Street, Mayfair, London, it was not for long. In the forty-fourth year of his age, namely, in 1792, some years before he had declared himself publicly in regard to inoculation of cow-pox, he took his degree of Doctor of Medicine from the University of St. Andrew's, by the loose method of nomination then in force, and from time to time he made additions to practical medicine. He published a paper in the *Transactions* of the Society for the Improvement of Medical and Chirurgical Knowledge, 1793, vol. i., p. 30, on *A Process for preparing Pure Emetic Tartar by Re-crystallization*; on which medicinal article John Hunter writes a jarringly droll letter, wherein he tells his correspondent that he is "puffing of his tartar as the best of all tartars, but has had no account of its success," and asks "whether he had not better let a bookseller have it to sell, as Glass of Oxford did his magnesia? Let it be called Jenner's Tartar Emetic, or anybody's else you please."

It is claimed for Jenner by his friends that at one of the local medical meetings he read a paper on the relation of heart-disease to rheumatic fever, and on another occasion an essay on angina pectoris, in which he traced that disease to ossification of the coronary arteries. It is further said that he diagnosed the affection of which John Hunter died so suddenly as "angina." But there is no written record bearing on these subjects left behind, on which we can found any correct conclusions as to his originality. The same must be said about certain treatises on ophthalmia, on the nature of hydatids, and on the condition of the lymphatic system in health and disease. What we are able to gather of him from these labours must be accepted from his biographer, Dr. Baron, whose enthusiastic admiration has to be taken with all the caution which the tone inspires. Presuming that Jenner did write essays on the all-important subjects named, it is deeply to be deplored that they were not retained and published in his time or immediately after his death. They would have given us a proper insight into his scientific character—an insight which might have removed all doubts and difficulties. A thousand

words on each topic would have been a treasure that would have set many a disquieted heart at rest. As it is, extenuating nothing, and setting naught down in malice, we must remain content to accept him on the one line of study with which his name is so intimately connected : the process of inoculating mankind with cow-pox as the grand preventative of small-pox.

THE ROOT OF HIS FAME.

A difficult question lies now before us. The root of the fame of Edward Jenner lies in the part he played in the act of introducing the art of vaccination as a preventative of small-pox. What was really the part he played ? Once again, "What is truth ?"

I shall not in this place attempt to inquire whether vaccination is a good, a doubtful, or a bad process. I shall not stay to inquire here into the real nature of cow-pox. These are questions of a distinct kind, having their own importance quite apart from the life and work of Jenner. For the moment, let the practice be accepted as worthy of the credit which its warmest advocates have assigned to it, and let us keep to the position of Jenner in relation to it, to this part of his life alone. We shall thus avoid all prejudices based on objections that have been brought against the practice of cow-pox inoculation, and out of which much difficulty has been raised.

We may take the year 1797 as the first year in which the introduction of cow-pox inoculation for the prevention of small-pox was publicly announced by Jenner. He had, as we have seen, already made a private communication on the subject, based on theoretical grounds, to his friend Gardner ; he had also conversed on the subject with Hunter, with Cline, and other friends. But all this was in private form of communication, and did not rest on any experimental demonstrations. In the year named, 1797, he became more decisive. He sent a paper detailing some experiments to the Royal Society, and for some strange reason the paper was returned to the author without being allowed a place in the *Transactions*. The inference drawn from this fact by the opponents of Jenner is, that the paper was rejected for deficiency of evidence ; but it is as fair to assign as a cause deficiency of judgment on the part of the judges, since accidents of that kind will occur in the best regulated societies, and especially when the matter under consideration is new to them. However that might be, the paper was not admitted, which to a Fellow of the Society must have been a very severe blow indeed.

It was, nevertheless, a blow from which he rallied, and which he returned by publishing, in June 1798, a small book entitled *An Inquiry into the Causes and Effects of the Variolæ Vaccinæ: a Disease discovered in some of the Western Counties of England, particularly Gloucestershire, and known by the Name of the Cow-Pox*. On this book of seventy pages, with four plates, the primary fame of Jenner reposes. No book so small has ever been talked about so much; no book has been read from the original so little; no book has been so much praised at second-hand; no book, of such dimensions, has made the name of any author so widely known; and, in all honesty and honour, there never was sent from the press a smaller work in essence as well as in substance. There need be no wonder that the Royal Society sent back the original paper on cow-pox, if it were no better than this meagre and elementary production.

On what, then, did the success of the work depend?—for success it had, unprecedented in the history of medical literature. To understand the success, we must go back to learn some of the preliminary steps of the process by which the results were obtained.

First and foremost, unfortunately for mankind in this and other countries, a practice had sprung up, about seventy years before the time of which we are now speaking, of inoculating for the small-pox, and this practice had been made so general that the country had become a grand nursery of the foul disease. Every town, nay, almost every house, was a loathsome nest of the malady. Sometimes, perhaps oftentimes, a town like Brighton, for instance, had its population enumerated in order that it might, systematically, be inoculated for small-pox; and so, as the induced disease became a centre for contagion by inoculation, all restrictions were taken off it. Small-pox was dispensed at large. Small-pox let alone has its season of epidemic intensity, and afterwards of decline; but by the plan of artificial cultivation, it was transformed, perforce, into unbroken activity. A hailstorm always sustained by human ingenuity could hardly have been more pernicious.

To meet this great and fearful evil of ignorance and practical imbecility, attempts were made to mitigate the admitted danger by diluting it. One or two experimentalists sought to effect the purpose by adding water to the small-pox virus, so as to induce a very mild small-pox, but failed in their intention. It was possible to dilute the virus to the extent of destroying its potency altogether; but if the dilution fell short of that, in other words, if it left the virus potent

enough to take effect at all, the disease inflicted was small-pox with all the old contagiousness.

Others tried a different mode: they inoculated with small-pox virus during the initial stage, before the appearance of pustules, and while as yet the virus existed in the form of lymph derived from a vesicle. The plan got the name of the *Suttonian system of inoculation*, and it unquestionably answered in that it caused a mild form of disease in those subjected to it, with a low mortality, and with fair, but by no means certain, immunity to after attacks. But here again stood out the objection: the inoculated person became, during his period of sickness, a centre of contagion. This was a bad result, and the world at large was ready at any moment to see a practice, with the dangers of which it was quite familiar, modified in any way that should give the protection, minus the collateral evil of contagion.

In the second place, there was a preliminary preparation for a change in the direction hoped for. In the year 1774, one Benjamin Jetsy, of Downshay, Purbeck, a farmer, being quite conversant with an every-day belief, derived from common experience, that persons who had suffered from a disease of the hands caught by milking cows infected with what was called *cow-pox*, became thereby exempt from small-pox, vaccinated his wife and two sons, whereby they, like himself, who had contracted cow-pox many years before, were rendered exempt from small-pox so certainly that when they were inoculated for small-pox some years later they did not take it. Jetsy did not claim this practice as a discovery, because ever since he was a boy he knew that those who were cow-poxed were exempt from small-pox. In addition to the knowledge held by Jetsy and those who lived in his time, it was further known that the disease called cow-pox was comparatively a mild and a safe disease; and that, although it was readily communicable from one system to another, it was not contagious by the ordinary method of contagion—by what is commonly known as “catching a disease,” *i.e.*, by proximity of one person with another, without direct inoculation.

In the third place, there was an idea, all but universal, that it was a necessity for every person once in life to suffer from small-pox. The universal acceptance of the process of inoculation had given rise to this barbarous superstition; and as the teachings of modern sanitary science, that communicable diseases would cease if proper measures of perfect cleanliness were taken for their suppression, had not then been communicated, the mind of the people was set on the

belief that something inoculatory must be done, or fatality from small-pox must be great. The process inoculatory, up to that time, was small-pox inoculation ; but such inoculation produced a contagious disease, and did not always succeed, even at that cost. Given, then, a new inoculation, that did not induce a contagious malady, and did succeed in protection, and a veritable miracle were instituted. Man had conquered nature.

According to the prevailing opinion held in Gloucestershire and Dorsetshire, Benjamin Jetsy acted practically, and, apparently, with successful results, when he inoculated his family with matter derived from the teat of the cow suffering from the disease called commonly cow-pox, which Jenner cleverly latinised into *Variolæ Vaccinæ*. In this act Jetsy did everything that could be desired for accomplishing the miracle named. He maintained the old method of inoculation ; he induced a disease which protected from small-pox ; and he induced a disease which was not contagious—above everything else the success that was wanted. These were the three points most conspicuous in the *Inquiry into the Causes and Effects of the Variolæ Vaccinæ* ; and as, on trial by other observers, the experience of successful vaccination was soon afterwards, on Jenner's suggestion, satisfactorily followed up in London by Mr. Cline, Drs. Pearson and Woodville, and other medical men, the proceeding was rapidly advertised all the world over, and Jenner and Jennerian practice became familiar on every tongue.

A last point advanced was, that, whereas small-pox inoculation left many bad after-effects, cow-pox inoculation left none whatever, but in regard to some diseases, like scrofula, exerted a beneficial rather than an injurious effect.

Jenner was, indeed, a fortunate man. He came out with his *Inquiry* just in the right nick of time. By the slightest touch of description he transformed a local belief or practice into a national one, and scored the first place as a medical observer and pioneer.

It is truly painful to say that the common opinion about the great labour of experiment to which Jenner submitted himself before he announced what is wrongly called his discovery, is mere childish adulation. His experiments are enumerated by himself, and may be put, with observations without experiment, at twenty-three ; so that, compared with the intense labour by which researches of a physiological kind are ordinarily carried out, they really rank as nothing in respect to labour. They were not, in any sense, or any particular,

original. At the same time, they need not be accepted as being what his enemies call deceitful or crafty. They were simply innocent researches gathered from commonplace experience, which, by good fortune of time and circumstance, were turned into extraordinary fame.

From a strictly moral point of view the *Inquiry* seems, to hard and logical men, tainted. In it a speculation was brought forward, that the disease called cow-pox in the cow was derived from grease in the horse, that is to say, from a virus derived from the fissures or cracks of the heels of a horse suffering from the grease. Men in charge of horses who afterwards milked cows communicated, it was suspected, the virus to the cow, and so came cow-pox. The idea was not started by Jenner, for he himself tells us that it was held in his neighbourhood as a common belief: because it had been observed that in dairies where women, who had nothing to do with horses, milked the kine, the cow-pox did not appear; and because the men who attended to horses affected with grease sometimes suffered from an eruption on their hands, horse-pox, which closely resembled the cow-pox eruption, and which, as Jenner essayed to prove, could, by inoculation, be transferred to the human subject. Jenner had to give up this hypothesis of the origin of cow-pox; but the worst that need be said on the matter is, that he was imbued with an innocent conceit. He had rather hastily jumped at the suggestion, and having, as he felt, very prominently endorsed it and promoted it, he held by it too pertinaciously. If he had only thought a little more; if, instead of leaping at the discovery of the cause of cow-pox, he had gone a little further back and asked how did the horse get the horse-grease, he would have seen that he had advanced a very little way indeed. But why should Jenner be specially blamed for a small bit of by-play in philosophy? Did not a great modern philosopher try to show that this earth was peopled from a germ carried to it by a meteorite? And did not the old philosophers make the earth rest on the back of one animal, and that animal on the back of another animal, and that other animal on—what? The ether of space? Perhaps. But the question still remains *in nubibus*.

Hard and logical minds deduce again from the *Inquiry*, and from other Jennerian essays, letters, and speeches, another touch of deception in the way in which Jenner distinguished between true and spurious vaccine virus. His foes said and say that this distinction was invented to cover failure in cow-pox inoculation. As if one should say, If vaccination, as it was called after a time—not by

Jenner, but by a surgeon named Dunning of Plymouth—if vaccination is performed and does not protect from small-pox, the virus used is spurious; but if vaccination is performed and does protect, the virus used is true. The explanation is certainly convenient; Jenner held by it; and hundreds of medical men have held by it, amongst whom it is possible that the present writer may, in early days, confess himself one. On reflection the explanation must be admitted as equivocal; but is it necessary to say that it was invented for a purpose? It is much more likely that Jenner, easy as an old shoe in matters of belief, believed it, and adduced it offhand, at a pinch, as the best reason he could offer to account for an unexpected difficulty—a difficulty which, it is fair to him to say, has not, to this day, been cleared away.

A more serious charge against Jenner is his inconsistency in regard to practice in his own family. As against the statement that he had been experimenting for years with cow-pox before he announced his work, in 1798, is the fact that in 1789 he inoculated his son Edward, then one year and a half old, with swine-pox; and having, by this plan, rendered the child resistant to the variolous test, let the swine-pox method drop. Also against him it is urged that in 1798 he had his second son Robert, who had been vaccinated but had not taken, inoculated for small-pox by Mr. Cother of Cheltenham, the boy being, as he thought, in danger of contracting small-pox by contact. But with a man placed like Jenner, we must not judge parental feelings too severely. *L'esprit est toujours la dupe du cœur.*

In 1798 Jenner came to London with his *Inquiry*, and received, first and foremost there, the experimental support of his old fellow-pupil Cline. On his essay becoming known he entered on a new career, fast and furious in its nature and much diversified in its character. With the world generally he triumphed, but with able adversaries he was obliged to fence and hold silence, and often retreat in a series of varying attitudes which leave cause for the most solemn regrets. In moving often to London on vaccination business he lost much of his little income of about £600 a year earned at Berkeley, and honour after all was but an empty sound. In 1802 he made petition to Parliament for a grant of money for his discovery, and after discussion in committee a grant of £10,000 was awarded him. Then he removed from Berkeley, "the valley," to London, and started in physician's practice in Hertford Street, Mayfair, to fail miserably in that position, and retreat back to Berkeley a poorer

man, almost, than when he left it. For a time he was engaged in disputations innumerable in relation to the Royal Jennerian Society, which superseded the Vaccine Institution, instituted by Dr. Pearson; and in 1806 his case for a grant was again before the House of Commons. The House referred to the Royal College of Physicians for a Report on the Jennerian researches; and about the middle of 1807, the Report having been presented and being favourable, another grant, this time of £20,000, was awarded by a majority of thirteen in an assembly of one hundred and seven members. The grant, unprecedented in the annals of medicine, was supplemented by other minor grants from different public bodies; whilst honours from all quarters literally poured in. The College of Surgeons elected Jenner into their body. The University of Oxford gave him the degree of Doctor of Medicine in 1813; and only one corporation of rank, from which a favour was sought, refused. The Royal College of Physicians would not have him save and except by the usual examination, a decision for which that body has been often fiercely belaboured, and for which it has, generously, withheld all explanation and all defence which could in the least degree offend, or excite a painful professional controversy.

On the Continent Jenner won golden opinions from the most powerful. Napoleon the Great is said to have expressed to Josephine, in regard to a request from Jenner, "We can deny nothing to that man." In brief, at home and abroad, all the world over, his name was indeed a household world.

In 1814 he was introduced to the allied sovereigns when they were in London, making, it is suggested, an impression on the Russian Czar which was not altogether favourable. In this same year he returned to Berkeley, never to see London and London life again. To Cheltenham for a change he would often retire, but the valley held him mostly for her own. Here, in 1815, he lost his wife, and from her death until 1823 he lived, comparatively, a lonely life, which towards its end was so sad that, to use his own words in a letter written to his friend Gardner, he "was never involved in so many perplexities." He died of apoplexy on January 26th, 1823. A lock of his hair removed after his death, and given to me by Mr. Bridgman, shows lines of grey, but retains many of the natural brown colour. From the same friend I have also a copy of an original letter written to Jenner by John Hunter on a great occasion, which the letter itself explains. The footnote was by Jenner.

"January, 1789.

"DEAR JENNER,—I wish you joy; it never rains but it pours. Rather than the brat should not be a Christian,* I will stand godfather, for I should be unhappy if the poor little thing should go to the devil because I would not stand godfather. I hope Mrs. Jenner is as well, and that you begin to look grave now that you are a father.

"Yours sincerely,

"JOHN HUNTER."

In the parish church of Berkeley will be found the tomb in which Edward Jenner was laid a few days after his death, and which bears an epitaph setting forth his virtues and his services to mankind. In Gloucester Cathedral he is honoured with a statue; and in 1859 Prince Albert, after presiding at a meeting in the library of the Royal College of Physicians, proceeded to Trafalgar Square and unveiled there the statue of him which has since been removed to the solitude of Kensington Gardens. This unveiling was the last act of enthusiasm connected with a name which now, thirty years later, is becoming more seriously assailed than it has ever been assailed, and with more power and scientific skill than has yet been its fate.

We started on this task by designating Edward Jenner a fortunate Æsculapian. He was so, for he won the admiration of a large majority of his cotemporaries as a great man and universal benefactor of mankind; in which light he is held by millions to the present hour. Whether the fame of his future is to be sustained as brightly as ever, no man who loves that which is true above that which is cherished, however dearly, dare affirm.

The times are changing fast, and we change with them. In these days prevention of disease is the ambition of medicine, in which ambition all doubtful systems, like that of preventing one disease by the substitution of another, must eventually be set aside. And, inasmuch as—

*Inoculation
Is bad sanitation,*

even inoculation of cow-pox may become, together with its caressed, flattered, and spoiled promoter, nor more, nor less, than a forgotten history.

* "Poor Edward.—E. J."

Sir Francis Bacon as a Master of Physic

MORE than once I have ventured to move from the strict line of Masters Medical, in order to present a picture of a Master in Science, who although not, in a technical point of view, a professor of medicine, was yet an important pioneer in medicine, and a teacher of it in some particular directions, theoretical and practical.

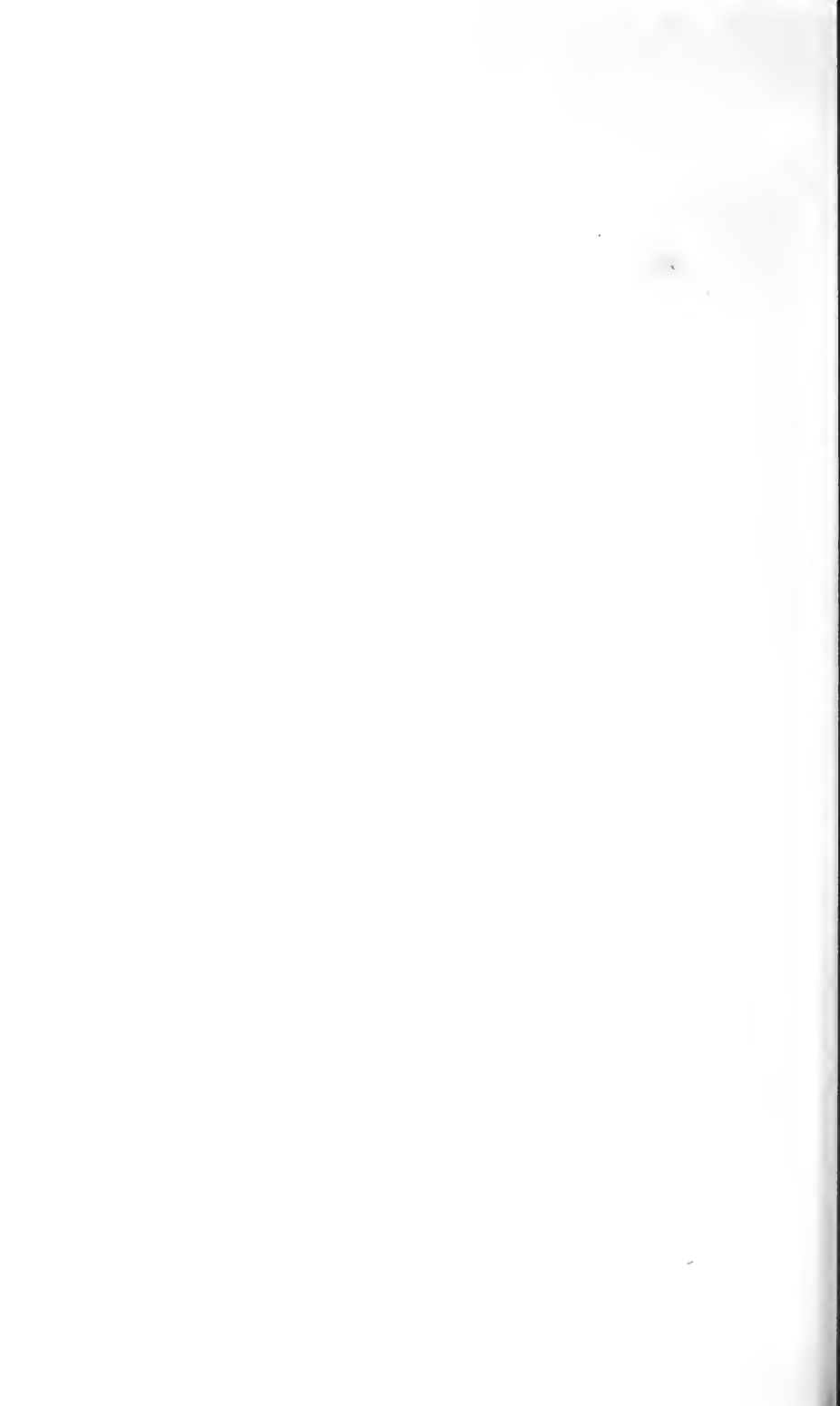
The philosopher selected for portrayal is one who, of all others, should be precious in the sight of those who have before them for their life's work a medical career. I refer to Sir Francis Bacon, Baron of Verulam, Viscount St. Albans, and for a short time Lord High Chancellor of England.

The remains of this illustrious man rest in the chancel of the ancient church of St. Michael's, within the precincts of old Verulam, by St. Albans ; and above them his "effigy" still sits in white marble, representing him as in contemplation, with an inscription describing his name, honours, and virtues. His remains were laid here, and the monument was erected by his faithful friend, Sir Thomas Meautys, but the inscription was written by Sir Henry Wotton. Standing, recently, before this monument, and—not to use the term profanely, but in its historical sense, as it was originally used—looking at "the effigy" in its contemplative posture, it occurred to me to ask the question, what service did this Lord Chancellor perform for our profession of medicine? I knew of him as a politician, as a lawyer, as a philosopher, as, in some sense, a poet ; I knew of him as the cotemporary of Shakespeare, of Ben Jonson, of our Kepler, of our Harvey, of Galileo, and of other immortals ; I had taken some small part in defending Shakespeare from the charge of being the foil and fool of this man ; but I had no very clear conception of what he did for our craft ; he did something, no doubt, but what that something was remained obscure, or at the best imperfect.



Fr Bacon

From print by Honbraken, 1737, after a portrait belonging to Matteo Pellegrini, 1580-1600, at age 16.5.



The desire to know more led me, during vacation time, to look up the work of Bacon on its medical side, and thereupon there appeared before me a new picture of him—a picture I had never suspected to be deducible—a medical student's picture : a picture which, for the use of students, I will endeavour to etch in miniature of writing, for them to read, study, and inwardly digest at their leisure.

One word more in this short prelude. Francis Bacon links on to medicine by three grips ; by philosophy of research ; by practical teaching of medicine in some of her most advanced and splendid departments ; and by wise counsel, applicable to scholars of all classes, and to none more than to those who carry out our divine ministrations amongst mankind.

As I intend in this essay to treat freely on the work of Bacon in its application to medical science, I may be permitted to be as brief as possible on the subject of his life, offering in fact no more than is sufficient to remind the reader what manner of man he was, and what position he filled in the age in which it was his destiny to play an important part.

There is little in romance that is more entrancing than the life of this great Chancellor and man of science, but how the details of it have been bandied about, represented and misrepresented, it were indeed hard to tell. He has been lifted up to the skies ; he has been chased into the bottomless pit. His works have been produced and reproduced in every conceivable form, from the form of mere abstracts in cyclopædias and school-books, to a library in the volumes of Basil Montagu, Hepworth Dixon, and the magnificent series of Spedding, who devoted his life to the task of collecting the labours of this master. Our best and ablest men have had their say in condemnation or commendation. Pope in distinct language first took shot at Bacon, delivering "fanged and poisoned," as Hepworth Dixon puts it, the label or the libel on him as "the wisest, brightest, meanest of mankind." Numbers have followed in the same course, including, to some extent, Hallam, Macaulay, Church, and, severest cut of all, another occupant of the woollen sack, the late John, Lord Campbell. On the other side he has had his friends and supporters, and none more sincere or earnest than they whose names were mentioned a line or two above—Montagu, Spedding, and the warm-hearted Hepworth Dixon.

It is natural that in controversy raised by such writers the argument should grow hot and fierce ; and that it does ; yet this fact also must be taken into account—that the controversy relates to the moral life

of the man exclusively, never to his wisdom. To his wisdom, to his learning, and to his industry all bow ; even Lord Campbell bends his stubborn neck to these attributes of Lord St. Albans.

The life of Bacon may be likened, after his own manner of comparing human and natural events, to a day of the early spring ; a day following the barren winter : a day short, fitful, and strange ; now bright and warm ; then tempestuous and cold ; anon, serene and brilliant ; at last, and suddenly, lowering, dismal, and dark as an eternal night. We may follow the incidents of his life on such a likeness, dividing his course into dawn and morning, midday and afternoon, evening and night.

THE DAWN AND THE MORNING.

The dawn of the life-day of Francis Bacon, on the 22nd of January, Old Style, 1561, two years and a few months previously to the birth of his cotemporary Shakespeare, and seventeen years previously to that of William Harvey, was in a home that might be called a palace, on the banks of the Thames, at the foot of Buckingham Street, off the Strand, London, near the fine water-gate afterwards erected in evidence of the artistic genius of Inigo Jones. The house was called York House, because in the reign of Queen Mary it had been occupied by the Archbishop of York. The student of to-day will find no outline of this famous residence, but he will not fail to observe that it stood in a commanding spot, and in one most convenient for a person whose business called him to Westminster, to the royal palace, and to the city, to all of which places its occupant, the illustrious father of the boy, was often summoned.

The parentage of the boy was splendid. His father, Sir Nicholas Bacon, a man of the first power and weight, was Lord Keeper to the Queen, Elizabeth ; while his mother, the daughter of Sir Anthony Cook, the tutor of Edward VI., was a woman of the pious sort, a mother of mothers, with talents which, under some circumstances, might have made her a great character in letters and learning, and with family connections which gave to her children relationship by marriage with the renowned Lord Burghley, Grand Treasurer to the Queen, and with many more of the distinguished leaders of the time.

By universal consent it is admitted that this child, with a birth morning so bright, as he grew up into a boyhood marked by beauty of face, clearness of intellect, and generosity of nature, became the

special favourite of all his circle. He attracted attention also, says Benjamin Martin, "by proofs of his surprising strength and pregnancy, insomuch that we may justly say his fame commenced with his childhood, and accompanied him to his grave." For this reason persons of worth and dignity delighted to converse with him, and the story is current that the Queen herself "was so charmed with the solidity of his sense, and the gravity of his behaviour, that she would often call him her 'little Lord Keeper.'" After his preliminary boyish studies he was transferred to Trinity College, Cambridge, where he was entered on the 16th of June, 1573, being then twelve years of age, under Dr. John Whitgift, afterwards Archbishop of Canterbury. In the University the abilities of the youth were not signalled by any special attainments, and at fifteen he had passed through what was then considered to be the complete University course. From Cambridge he was sent in 1576 to Paris, under the care of the Queen's Ambassador there, Sir Amias Paulet. In this position, young as he was, he was entrusted as the bearer of a dispatch or commission to the Queen, which duty he accomplished with great credit. Returning to Paris, he set forth on a tour through the Continent, and, settling at Poitiers, devoted three years to close study, but was unfortunately stopped in his work by the news of the death of his father, an event which compelled him to come back to England, to find himself thrown on his own exertions for his means of livelihood. He chose the law as his profession, and at once entered as a student of Gray's Inn, in which centre of legal learning he won his way with all with whom he was connected, in his usual successful manner. The study of the law, naturally, now held the first place in his thoughts, but he was not content to sacrifice his devotion to natural science, to which, during his University career, and, indeed, through the whole of his career, he had felt a strong predilection. At this time, in fact, he framed out much of the grand work in philosophy with which his name and fame are indissolubly bound.

Called to the bar, Bacon became, in a short time, a powerful advocate; but, not quickly becoming popular, he entered the arena of political life by election into the lower House of Parliament for Melcombe. In the House he was soon so distinguished as a speaker that it was said when he commenced to speak the listeners sat in fear of his speech coming to a close, so entrancing was his oratory. Still his promotion in his own profession continued to be singularly slow—a fact the more to be wondered at because both the

Queen and her great minister, Burghley, were wont to consult him on the most important subjects, and on matters purely personal showed him the most splendid favours, making him at the age of twenty-eight a member of Her Majesty's Council, and deferring to him as one on whose judgment they placed the firmest reliance. In his professional sphere he was elected, also, Lent Reader in his Inn. Now, too, as the letters of his mother truly show, he and his brother Anthony lived what is vulgarly called "a free life," entertaining largely, lending to and assisting persons who were in a better position than themselves, and keeping up their state, notwithstanding the dear mother's remonstrances, by frequent applications to the money-lender. In brief, this part of the morning of the life of Bacon was a continuous struggle, relieved, in part, by one or two grants from the Queen, and tempered by the study of natural science and the magnificent schemes of reform which he contemplated and shadowed forth in his first essay, a lost treatise, *Temporis Partus Maximus* (The Greatest Birth of Time), but rendered unusually arduous by the neglect to which he was subjected, the charge of being a dreamer, and his own imprudence.

In this troublous period he experienced a special anxiety from his companionship and friendship with the unfortunate Earl of Essex, for long the beloved, in all innocence, of the Queen, but the rebel against her authority, and, at last, a traitor to her personal safety. Essex, while in power, did on his side all that he could, and far more than was wise of him to do, in order to advance the interests of Bacon, by which he raised against him objections on the part of Sir Robert Cecil, which put a stop to his promotion, and gave promotion to persons of inferior talents. The keen sense of disappointment brought him into indifferent health, and to serious bodily and mental suffering. To such despair did he at this time sink that he was led to contemplate retirement from this country altogether, and was only saved from that step by the consideration that it was his duty to follow up and complete the chief studies of his life. To some extent, therefore, he withdrew from active public service, and followed the leading bent of his inclination, for which step we of the brotherhood of science can never be too thankful.

The interval of partial retirement from public affairs, if it can be called such, was not long. Many circumstances called the philosopher back to his active career. The Queen made him one of her counsel learned in law, and endless subjects which he could best discuss and advise upon were placed in his hands. Amongst these

none was more painful than the trial of the unfortunate, the misguided, the affectionate, and yet guilty Essex. He had gauged the qualities of Essex with the finest subtlety; he had foreseen his danger long before it occurred; he had given him the kindest, the wisest, the most brotherly advice. It was of no avail. A great plot called the Irish plot had been entered into by Essex, in which he proved false of false, and for which he was spurned by many who once craved his notice. But not by all; for, ignorant as the Queen herself of the lowest depth of political crime to which the Earl had fallen, Bacon still pleaded for him, with rebuffs for his pains, whenever the ear of the Queen was open to hear. Once the favoured advocate asks or suggests that the Earl shall go back to Ireland. "When I send Essex back to Ireland I will marry you, Mr. Bacon. Claim it of me," was the answer of Her Majesty.*

In these varieties of labour, political, professional, philosophical, and social, Bacon passed through the morning of his life. He had been accounted handsome, and the portrait of him, which accompanies this memoir, shows better than any mere verbal description that this estimate of him was true. Moreover, he was most particular about his attire, dressing with exquisite taste, and unwilling that any one should see him shorn of his feathers. But bad health, the effects of luxury perchance, marred the healthy beauty of his youth before mid-age, while the pangs of gout, anxiety, and worry made premature age a certain fate.

THE MIDDAY AND THE AFTERNOON.

As the sixteenth century approached its close Bacon entered the meridian of his career. He was still out of remunerative service, and was still in debt. At this period he either fell in love with a beautiful widow, Lady Hatton, a granddaughter of Lord Burghley and niece of his cousin Cecil, or with the fine fortune of that captivating lady. Some say one thing, some say the other. The suit did not succeed: the lady had read in one of the Baconian essays that love ranks as an ignoble passion, and instead of marrying the author of such a philosophy she married the Attorney-General, Sir Edward Coke, a

* See *Personal History of Lord Bacon*, from unpublished papers, by William Hepworth Dixon, p. 112; a work which every one should study who wishes to see the immortal Chancellor in the most friendly biographical light, and who would read as a literary pleasure one of the most charming biographical works in the English tongue. See also a *Vindication* of Bacon, and a most able analysis of his character, by A. Elley Finch.

creature who might be fitly compared as the Satyr to the Hyperion who had previously claimed her hand.

In this midday of life two other calamities befell Francis Bacon : one, the trial and execution of his old friend the Earl of Essex, in whose trial he was obliged to take a professional part ; and the other the loss of his beloved Anthony, brother in kinship, in sympathy, and in adversity, equally and strongly.

The death of the Queen and the ascent of James I. to the throne, the next events influencing Bacon in his career, turned out favourably for him. He was elected member for Ipswich in the first Parliament called by the King, and although bitterly opposed in his profession by Coke, began, at last, to shine in the highest legal spheres. The King received him kindly, conferred on him knighthood, and was glad to avail himself of his services. He now once more sought marriage, and this time was successful in winning as his bride Alice Barnham, the daughter of a rich Alderman, Benedict Barnham. Alice, a handsome girl, had lost her father, and had become the stepdaughter of Sir John Pakington, one of the strangest of knights in all the history of knightdom. The marriage, celebrated in St. Marylebone Chapel, was followed by a grand dinner in York House, to which dinner his cousin Robert Cecil would not come, although, deformed as he was, he might, in proper ceremony, have kissed the beautiful bride.

From this time all went on famously, for a season, with our philosopher, who, in the midst of his glory, had devoted sufficient time for his work on the *Advancement of Learning*, and had made science the leisure of his days. The work had come out in two parts in the year 1605, with a dedication to the King. That the King did not fully understand it was admitted by himself ; but as the wisest men in the world began to extol it, it won its way, and indirectly did its author so much service in his worldly affairs that some cotemporary wit spoke of the *Advancement of Learning* as the advancement of Bacon. Queen Elizabeth, his "good old mistress," as he was accustomed to call her, had recognised in him "great wit and an excellent gift of speech," but in law she rather thought "he would make show to the uttermost of his knowledge than that he would be deep," an opinion, it would seem, that was largely shared by all who knew him.

But now the tide turned. Two years after the appearance of his great book he was made Solicitor-General on the elevation of his rival Coke to the Justiceship of Common Pleas ; and in 1613 he had

sufficient influence with the King to get Coke transferred to the Chief Justiceship of the King's Bench, Herbert raised from the position of Attorney-General to the Common Pleas, and himself, in 1616, to the Attorney-Generalship. This was followed by his election to the office of Privy Councillor in the same year, and to that of Lord Keeper, his father's former office, in 1617. Lastly, in 1619 he was promoted to be Lord High Chancellor, and received the title of Baron of Verulam, which, on the 22nd of January, 1621, his sixtieth birthday, was raised to that of Viscount St. Albans.

The elevation to the great social position which Bacon had now obtained was preceded by the publication of the immortal work, the *Novum Organum*, in the composition of which he had "taken all knowledge to be his province," and by which he was elevated in the world of science to a position quite as exalted as that he had been raised to in the little world of rank and fashion. He seemed, indeed, now to be the most envied of mankind.

"Let him that thinketh he standeth take heed lest he fall," is a proverb never better exemplified, as to its wisdom, than in the case of this brilliant Lord Chancellor, wise philosopher, and companion of a king. He had fitted up York House resplendently. He had a villa at Kew. He had expended £10,000 on Gorhambury. At the court at Theobalds, by Cheshunt, the favourite residence of James, he was triumphantly invested as Viscount, the Lords Buckingham and Carew supporting his robe of state, and Wentworth bearing his coronet. Three months later he was ignominiously divested of his pomp and place, and by a decree of his peers was adjudged to pay a ransom of forty thousand pounds, to be imprisoned in the Tower during His Majesty's pleasure, to be for ever incapable of any office, and never to sit in Parliament nor come within the verge of the Court.

Why such a sentence should have been passed on this man baffles the inquiries of those who, like myself, try most sincerely to arrive at the whole truth. It is not to be ignored that he had lived extravagantly, and had for years been keeping up the shimmer of false glory, a glory sumptuously sustained on debt. He had made enemies of potent powers, including the favourite, Buckingham, and his most envious rival Lord Justice Coke. He had, by his own confession, laid himself open to his enemies in having accepted fees, gifts, fines, and presents, some by his officers, some by himself; but never, he declared, as a reward to pervert justice. He had been "careless, not criminal"; and really, when the worst is said against

him and the best for him, this is what it all amounts to from the evidence obtainable. To his judges it seemed sufficient to warrant their sentence, but that the sentence itself was of little real worth is shown by the facts that his confinement in the Tower lasted but two days; that he was soon permitted to reside in his own house at Gorhambury; that he was directed by the King to write a history of King Henry VII.; that, in 1625, he received a full pardon from the King; and that had his health and strength remained he would, according to common consent, have been restored both to public and royal favour.

THE EVENING.

We have seen Francis Bacon in various shades and fortunes. He has been before us as a child of fortunate birth; as the admired of the court; as a youth full of hope; as a lawyer without money; as a parliamentarian without office; as a spendthrift in deep debt; as rising, at last, from one legal office to another until he reaches the highest position in his profession; as falling suddenly from that high estate into the lowest ignominy; and finally, by the grace of the King, retiring to his quiet home at Gorhambury to reflect there on all his strange vicissitudes and, as it turned out, to prepare to die.

In and through each of these strange vicissitudes he never loses one distinctive character. He is all through a philosopher of the deepest, keenest type. In his final solitude he regrets most that he has "misspent his talents in things for which he was not fit." By this he meant that philosophy, purely, was the only work he ought to have been engaged in; on which thought Spedding asks: If he had retired from public life and lived for private pursuits, would he not, if political affairs had gone wrong, according to his mind, have again considered his time misspent? No doubt of it. And more. Had he retired on philosophy he might never have been a great philosopher, for life is a forced state, and philosophy is forced out of life. In short, as all students of life too soon discover, while every active-minded man feels if he could only find time for retirement he would do some great thing, he learns practically that when he does find time he does nothing as he hoped to do. It is a lesson which is well worthy of being learned from the life of Sir Francis Bacon, that his philosophy was nourished and sustained by his dealings with and knowledge of the living world around him.

In his retirement, when it came, he lived on his past. Allowed to retire to Gorhambury in the month of June 1621, he wrote there

Sir Francis Bacon as a Master of Physic 411

The Reign of King Henry VII. ; The History of the Winds ; a new edition of The Advancement of Learning ; A History of Life and Death ; A History of the Density and of the Rarities of Bodies ; and the Sylva Sylvarum ; to which was added his famous fable *The New Atlantis*, published afterwards by his chaplain, friend, and secretary, Dr. Rawley, as "unfinished."

FRANCIS BACON ON PHYSIC.

From this perusal of the career so far of Sir Francis Bacon, Lord of Verulam and Viscount St. Albans, let us turn to those of his philosophic labours which relate to the science and art of physic.

In all the studies of Francis Bacon physic plays a part, for Bacon was by nature a physician. He knew that himself. To Sir Humphrey May he expresses, "I have been ever puddering in physic all my life." What his views were as to the future of physic are summed up beautifully in *The New Atlantis*, where too will be found anticipations of the Eiffel Tower, of flying-machines, of locomotive engines, of Darwinian evolutions, and of endless accomplished and as yet unaccomplished discoveries and inventions. That *The New Atlantis* was left unfinished by its author is no wonder. It could never be finished, because, like time, it is a story that could never end, so long as man lives to fill time with invention and history.

His labours in medical science and art, preventive and curative, deserve our consideration in relation to three points on which he gave advice :—

- (1) In respect to method of scientific research in medicine.
- (2) In respect to some details of medicine proper, but with special reference to that part of it called the preventive part.
- (3) In respect to words of counsel to scholars, particularly to those who are entering into professional labours.

ADVICE IN RELATION TO METHOD OF SCIENTIFIC RESEARCH.

The essence of the Baconian method of research it will be useful here to give in the author's own words. "In science the induction which proceeds from simple enumeration is puerile ; it leads to uncertain conclusions, and is exposed to danger from one contradictory instance, deciding generally from too small a number of facts, and those only the most obvious. But a really useful induction, for the

discovery and demonstration of the sciences, should separate nature by proper rejections and exclusions, and then conclude for the affirmative after collecting a sufficient number of negatives." This is the best exposition of the Baconian method. In another the method is elucidated. "There are and can exist but two modes of discovering truth. The one hurries on rapidly from the senses and particulars to the most general axioms, and from them as principles, and their supposed indisputable truth, derives and discovers the intermediate axioms. This is the way now in use. The other constructs its axioms from the senses and particulars, by ascending continually and gradually, till it finally arrives at the most general axioms, which is the true but unattempted way."

In another place he decries the folly of axioms determined on purely by argument, "since these can never assist in the discovery of new effects; for the subtlety of nature is vastly superior to that of argument. But axioms properly and regularly abstracted from particulars easily point out and define new particulars, and therefore impart activity to the sciences."

To state that this method which Bacon advocated and insisted on was an original method, absolutely peculiar to and originating with him, would be to say that no grand scientific fact had ever been worked out, by that method, before he defined it. This would be untrue; for at the time when he lived, a predecessor in practical science, one of our own craft, Dr. William Gilbert, whose researches were known and criticised by him, had discovered a world of new truth in relation to magnetism and electricity, and had invented the term electricity, following in all his work the precise mode of inquiry which has obtained the title of Baconian. In the same period another of our fraternity, Kepler, wrought out the ellipse of the planetary bodies by a grand application of the exclusion process; while Galileo, observing the planet Jupiter, about the year 1609, discovered, by the same process of induction, that the bodies near to Jupiter are moons of the planet and not fixed stars of small magnitude. Again, our Harvey, who knew of Bacon's works, who was physician to Bacon, and who said of him, critically, that "he wrote philosophy like a Lord Chancellor," pursued the selfsame line of investigation.

These facts, however, in no way detract from the honour that is due to the author of the *Advancement of Learning* and of the *Novum Organum*. Those who preceded him had been working on the lines he laid down, not because of the existence of any distinct and

recognised method, but by the leading of their own individual talent and insight. What they did for their own research Bacon compounded into a system applicable by all investigators and for all time. As a system of research it is perfect, and in medicine is more important than any other means towards discovery that has ever been attempted. The student of medicine can and ought to apply it in every part of his career.

ADVICE IN RELATION TO PRACTICE AND SANITATION.

It is not remarkable that Bacon should have known so much about medicine. He had read Celsus, whom he holds to have been a practitioner, carefully, and he was equally well read in all other classical authors of physic best known in his day. He was given to experiment, and, as he shows us in his intentionally incompleted *Atlantis*, he was wont to anticipate many of the great advances which have since been made. But he is most impressive on the means of preserving health, and with him on this point we may well be satisfied. Take, as a first example, his views on—

The Regimen of Health.

“There is a wisdom beyond the rule of physic—a man’s own observation ; what he finds good and what he finds hurtful is the best physic to preserve health.

“In sickness respect health principally, and in health action. For those that put their bodies to endure in health may, in most sicknesses which are not acute, be cured only with diet and tendering.

“Beware of sudden change in any great point of diet, and, if necessity enforce it, fit the rest to it ; for it is a secret both in nature and the state, that it is safer to change many things than one.”

“Physicians are some of them so pleasing and conformable to the humour of the patient that they press not the true cure of the disease ; and some others are so regular in proceeding according to art for the disease, that they respect not sufficiently the condition of the patient. Take one of a middle temper.”

This rule was never more necessary for a student of medicine to learn than in the present day. The danger, however, is much greater of falling into the error of the first than of the second

group. The knowledge which pleases the humour of the patient is by far the most profitable knowledge in a worldly point of view. In these days of desperate free-will you must not, my student, force life itself upon a patient, in opposition to the patient's wishes. If you do you may lose your patient whatever may happen.

Medicine, Curative and Preventive.

"Medicine is a science which has been hitherto more professed than laboured, and yet more laboured than advanced. We divide it into three parts or offices: viz., first, the preservation of health; second, the cure of diseases; and third, the prolongation of life. For this last part physicians seem to think no capital part of medicine, but confound it with the other two; as supposing that if diseases be prevented, or cured after invasion, long life must follow of course. But then they do not consider that both preservation and cure regard only diseases, and such prolongation of life as is intercepted by them. Whence the means of spinning out the full thread of life, or preventing, for a season, that kind of death which gradually steals upon the body by simple resolution and the wasting of age, is a subject that no physician has treated suitably to its merit."

"A work is wanting upon the cures of reputed incurable diseases, that physicians of eminence and resolution may be encouraged and excited to pursue this matter as far as the nature of things will permit; since to pronounce diseases incurable is to establish negligence and carelessness, as it were, by a law, and screen ignorance from reproach."

"And these are the things wanting in the doctrine of medicine for the cure of diseases; but there still remains one thing more, and of greater use than all the rest: viz., a genuine and active natural philosophy, whereon to build the science of physic."

"Things seem to us preservable either in their own substance or by repair: in their own substance, as a fly, or an ant, in amber; a flower, an apple, etc., in conservatories of snow; or a corps of balsam; by repair, as in flame, and in mechanic engines. He who attempts to prolong life must practise both these methods together; for separate, their force is less. The human body must be preserved as bodies inanimate are; again, as flame; and lastly, in some measure as machines are preserved. There are, therefore, three intentions for the prolongation of life: viz. (1) to hinder

waste ; (2) to secure a good repair ; and (3) to renew what begins to decay."

Here again are a series of rules which no modern physiologist could render in clearer or truer language. The science which should teach how to prevent waste, to secure repair, and to renew what begins to decay, would make the art, or in other words the practice of medicine, perfect ; and he who as a practitioner is nearest to this skill, though he may be far off it, is nearest to perfection. Every student should enter these directions and aspirations of our present master of physic on his mental tablet in a first and prominent place.

Long and Short Life.

"Inquire diligently of desiccation, aërication, and consumption of bodies inanimate, and of vegetables, and the ways and processes by which they are done ; also of the recovery of bodies to their former freshness after they be once dried and withered. From the inquisition touching bodies inanimate and vegetables, let it pass on to other living creatures beside man.

"Inquire touching the length and shortness of life, with the due circumstances which make most for long or short lives.

"Inquire touching the length and shortness of life in men, according to the ages of the world, the several regions, climates, and places of their nativity and habitation.

"Inquire touching the length and shortness of life in men, according to their races or families, as if it were a thing hereditary ; also according to their complexions, constitutions, and habits, their statures, the manner and time of their growth, and the making and composition of their members.

"Inquire touching the length and shortness of life in men, according to the times of their nativity, not astrologically, but as whether they were born in the seventh, eighth, ninth, or tenth months ; also whether by night or by day, and in what month of the year.

"Inquire touching the length and shortness of life in men, according to their face, diet, government of their life, exercises, and the like.

"Inquire touching the length and shortness of life in men, according to their studies, their several courses of life, the affections of the mind, and divers accidents befalling them.

"Inquire, apart, touching those medicines which are thought to prolong life.

"Inquire touching the signs and prognostics of long and short life, those which may be seen and observed even in health, whether they be physiognomical signs or any other.

"Inquire touching those things which conserve the body of man from aërefaction and consumption, at least which put off and protract the inclination thereto.

"Inquire touching those things which pertain to the process of alimentation (by which the body of man is repaired), that it may be good with best improvement.

"Inquire touching those things which purge out old matter and supply with new.

"Inquire touching the point of death, and the porches of death leading thereunto from all parts, so that death be caused by a decay of nature and not by violence.

"To know the character and form of old age, make a collection of all the differences both in the state and functions of the body, betwixt youth and old age, that by them you may observe what it is that produceth such manifold effects; let not this inquisition be omitted.

"Inquire diligently touching the differences in the state of the body and faculties of the mind in youth and old age; and whether there be any that remain the same without alteration or abatement in old age."

On Death.

"I have often thought upon death, and I find it the least of all evils. All that which is past is as a dream; and he that hopes or depends upon time coming, dreams waking. So much of our life as we have discovered is already dead; and all those hours which we share, even from the breasts of our mothers until we return to our grandmother the earth, are part of our dying days, whereof even this is one, and those that succeed are of the same nature, for we die daily; and as others have given place to us, so we must give way to others.

"I know many wise men that fear to die; for the change is bitter, and flesh would refuse to prove it; besides, the expectation brings terror, and that exceeds the evil. But I do not believe that any man fears to be dead, but only the stroke of death; and such are my hopes, that if Heaven be pleased, and Nature renew but my lease

for twenty-one years more, without asking longer days, I shall be strong enough to acknowledge without mourning that I was begotten mortal. Virtue walks not in the highway though she go *per alta*: this is strength and the blood to virtue, to condemn things that be desired, and to neglect that which is feared.

"In my own thoughts, I cannot compare men more fitly to anything than to the Indian fig tree, which, being ripened to his full height, is said to decline his branches down to the earth, whereof she conceives again, and they become roots to their own stock. So man, having derived his being from the earth, first lives the life of a tree, drawing his nourishment as a plant; and, made ripe for death, he tends downwards, and is sowed again in his mother the earth, where he perisheth not, but expects a quickening.

"So we see death exempts not a man from being, but only presents an alteration: yet there are some men (I think) that stand otherwise persuaded. Death finds not a worse friend than an alderman, to whose door I never knew him welcome; but he is an importunate guest, and will not be said nay."

These are the thoughts of a man who has passed the grand mental climacteric rather than of the student who is in his first decade of practical life. Yet the student may read with prescience what he must learn with labour.

Treatment of Disease by Remedies.

"It is a matter of great wisdom to know what to prescribe, what to permit, and to let Nature work the rest.

"A wise physician will consider whether a disease be incurable, or whether the cure of it be not full of peril; and if he find it to be perilous, let him have recourse to palliation, and alleviate symptoms without busying himself too much with the perfect cure.

"Every violent remedy is pregnant with some new evil.

"While things are wavering, watch; when they have taken their direction, act.

"Although a man would think by the daily attention which physicians pay to their patients, their visitations, nursings, and prescriptions, that they were pursuing the cure diligently and following it up by a certain path; yet let a man look more deeply into the prescriptions and visitations, and he will find the most of them full of vacillation and inconsistency, devices of the moment, without any settled or foreseen course of cure; whereas they ought, from the

first, as soon as ever the disease is discovered and known, to resolve upon some regular plan of treatment, and not depart therefrom without good reason. *It is order, pursuit, sequence, and skilful interchange of application which is mighty in nature. And these things, although they require greater judgment in prescribing and more constant obedience in observing, yet make up for it abundantly by the magnitude of the effects they produce.*"

Up to the present time this criticism of Sir Francis Bacon holds good.

"I conceive that it would be of great use if some physicians, among the more distinguished for learning and practice, would compose a work on medicines tried and approved *by experiment* for the cure of particular diseases."

In our day this recommendation for amendment is one of the most hopeful signs of advancement. The work has been delayed long because medicine has had to wait for chemistry, and is still waiting for further enlightenment on the relationships of vital and physical combinations and constructions.

"Variety of medicines is the child of ignorance ; and if it be true, according to the proverb, that 'many dishes have made many diseases,' it is not less true that many medicines have made few cures."

The student has here a most wise and true precept, specially applicable to the present period, when so many anodynes, hypnotics, narcotics, tonics, antipyretics, and purgatives are day by day being forced upon him, so that no time whatever is afforded him to learn the action of one before it is out of date and another is thrust into its place. I have been forty years studying the action of one narcotic, opium, the prince of narcotics, and am not yet master of the subject ; I have been the same time learning the action of one antipyretic, ammonia, the prince of antipyretics, and am not master of it. How then can we learn so many, or fail to see with Francis Bacon that "variety of medicines is the child of ignorance" ? The student may commit this saying to heart with infinite profit.

"It helpeth both in medicine and aliment to change, and not to continue the same medicine and aliment still. The cause is, for that nature, by continual use of anything, groweth to a satiety and dulness, either of appetite or working ; and we see that assuetude of things hurtful doth make them lose their force ; as poison which, with use, some have made themselves to brook. And therefore it is no marvel, though things helpful, by custom, lose their force to help.

I count intermission almost the same thing as change; for that that hath been intermitted is, after a sort, new.

"Some believe that if the quantity be increased or multiplied the power and virtue is increased or multiplied proportionately. And this they postulate as if it had a kind of mathematical certainty, which is utterly false."

"We see that if men fall to subdivide their labours, as to be an oculist in physic, or to be perfect in some one title of land, or the like, they may prove ready and subtile, but not deep or sufficient, no, not in that subject which they do particularly attend, because of that consent which it hath with the rest. Sciences distinguished, have a dependence upon universal knowledge, to be augmented and rectified by the superior light thereof, as well as the parts and members of a science have upon the *maxims* of the same science, and the mutual light and consent which one part receiveth of the other."

In what is written above, Bacon criticises and corrects one of the most dangerous courses of physic of the current time. Yet in his day specialism was at a discount; nay, practically, in contempt, as compared with what it is now, so rampant and so seductive. All students, therefore, should learn and retain for a better day, which they may help to forward, the truth about special practice—that its professors may be "ready and subtile, but not deep or sufficient, no, not in that subject which they do particularly attend, because of that consent which it has with the rest."

Practical Sanitation.

"Houses are built to live in, and not to look on; therefore let use be preferred before uniformity, except where both may be had. Leave the goodly fabrics of houses, for beauty only, to the enchanted palaces of the poets, who build them with small cost. He that builds a fair house upon an ill seat, committeth himself to prison: neither do I reckon it an ill seat only where the air is unwholesome, but likewise where the air is unequal; as you shall see many fine seats set upon a knap of ground, environed with higher hills round about it, whereby the heat of the sun is pent in, and the wind gathered as in troughs; so as you shall have, and that suddenly, as great diversity of heat and cold as if you dwelt in several places. Neither is it ill air only that maketh an ill seat; but ill ways, ill markets, and, if you will consult with Momus, ill neighbours. I speak not of many more—want of water, want of wood, shade, and

shelter, want of fruitfulness, and mixture of grounds of several natures ; want of prospect, want of level grounds, want of places at some near distance for sports of hunting, hawking, and races ; too near the sea ; too remote ; having the commodity of navigable rivers, or the discommodity of their overflowing ; too far off from great cities, which may hinder business ; or too near them, which lurcheth all provisions, and maketh everything dear ; where a man hath a great living laid together ; and where he is scanted."

"The goodness of the air in places is better distinguished by experience than by signs. I consider it to be best in places that are thoroughly exposed to the wind, if the soil is dry, and not altogether parched or sandy, and is not entirely treeless, but interspersed with some groups here and there for shade. Rivers I consider injurious, unless very small, clear, and gravelly."

"It seems strange, especially as mineral waters have been so celebrated by chemists, though safer for external than internal use, that nobody hath hitherto attempted any artificial imitations of natural baths and medicinal springs, whilst it is acknowledged that these receive their virtues from the mineral veins through which they pass ; and especially since human industry can, by certain separations, discover with what kind of minerals such waters are impregnated, as whether by sulphur, vitriol, iron, etc. And if these natural impregnations of waters are reduced to artificial compositions, it would then be in the power of art to make more kinds of them occasionally, and at the same time to regulate their temperature at pleasure. This part therefore of medicine, concerning the artificial imitation of natural baths and springs, we set down as deficient, and recommend as an easy as well as useful undertaking."

"It is strange that the use of bathing, as a part of regimen, is left. With the Greeks and Romans it was as usual as eating and sleeping. Certain it is that bathing, and especially anointing, may be so used as to be a great help to health."

"Judgment may be made of waters by the soil whereupon the water runneth : as pebbly is the cleanest and best tasted ; and next to that clay water ; and thirdly, water upon chalk ; fourthly, water upon sand ; and worst of all, upon mud. You may not trust waters that taste sweet, for they are commonly found in rising grounds of great cities, which must needs take in a great amount of filth."

"It is commonly seen that more are sick in the summer and more die in the winter, except it be in pestilent diseases, which commonly

reign in summer or autumn. The reason is, because diseases are bred chiefly by heat, but then they are cured most by sweat and purge, which in the summer cometh or is provoked more easily. As for the pestilent diseases, the reason why most die of them in the summer is because they are bred most in the summer, for otherwise those that are touched are in most danger in the winter."

"The general opinion is, that years hot and moist are most pestilent, upon the superficial ground that heat and moisture cause putrefaction. In England it is not found true, for there have been great plagues in dry years. Drought tainteth the waters commonly, and maketh them unwholesome."

"Many diseases, epidemical and others, break out at particular times, and the cause is falsely imputed to the constitution of the air at that time when they break forth or reign, whereas it proceedeth indeed from a preceding sequence and series of the seasons of the year; and therefore Hippocrates in his prognostics doth make good observation upon the diseases that ensue upon the nature of the precedent four seasons of the year."

"It seems to be approved by experience that a spare and almost Pythagorean diet, such as is prescribed by the stricter orders of monastic life, or the institutions of hermits, which regarded want and penury as their rule, produces longevity. . . . But if the diet should be a little more generous, and without so much rigour and mortification, yet so long as it is regular and consistent it produces the same result. For in flames likewise we see that a somewhat greater flame, if it be steady and calm, consumes less of its fuel than a smaller flame that is blown about, and alternately strong and weak."

"The saying which forbids many dishes is for a censor rather than a physician. . . . The various and somewhat heterogeneous mixture of aliments finds a better and quicker passage into the veins and juices than a simple and homogeneous diet does. Besides, it has great power to excite the appetite, which is the spur of the digestion."

"The preparation of meats, bread, and drinks, if it be well ordered and agreeable to this intention, is of very great importance. And although it be a thing mechanical and savouring of the kitchen and the cellar, yet it is worth more than the fables of gold, precious stones, and the like."

"Extracts of meats and minces well seasoned are good for old men; in extreme old age food ought to be so prepared as to be almost half way to chyle.

"We must be cautious about spices, wine, and strong drink, and use them very temperately, with intervals of abstinence."*

WORDS OF COUNSEL.

The last selection I make from the words of Sir Francis Bacon relates to his advice on physical and mental adaptations for health, life, and labour.

"With regard to motion and exercises: fatigue and all motion and exercise that is too rapid and violent, as running, games at ball, fencing, and the like, are injurious; as also those exercises, in which our strength is exerted and strained to the uttermost, as leaping, wrestling, and the like. . . . On the other hand, exercises which provoke a motion tolerably strong, yet not too rapid, or requiring the uttermost strength, such as dancing, archery, riding, playing at bowls, and the like, are not injurious, but rather beneficial."

"Exercises to distribute the juices over the body should affect all the members equally; not (as Socrates says) that the legs should move and the arms rest, nor the contrary; but that all the parts should share in the motion."

"Much motion and exercise is good for some bodies; and sitting and less motion for others. . . . Likewise men ought to beware that they use not exercise and a spare diet both, but if much exercise, then a plentiful diet; and if sparing diet then a little exercise."

"To be free-minded and cheerfully disposed at hours of meat and of sleep and of exercise is one of the best precepts of long lasting. As for the passions and studies of the mind, avoid envy; anxious fears; anger; fretting inwards; subtle and knotty inquisitions; joys and exhilarations in excess; sadness not communicated. Entertain hopes; mirth rather than joy; variety of delights rather than surfeit of them; wonder and admiration, and therefore novelties; studies that fill the mind with splendid and illustrious objects, as histories, fables, and contemplations of nature."

"Envy is the worst passion;—and it is so much the worse because it is always at work, and (as they say) keeps no holidays."

"Hope is of all affections the most useful, and contributes most to prolong life, if it be not too often disappointed, but feed the imagination with the prospect of good. They, therefore, who set up and

* For an admirable analysis of the medical writings of Bacon the student may consult two brief but most instructive essays by Dr. John Dowson, published by H. K. Lewis in 1867.

propose some definite end as their mark in life, and continually and gradually advance thereto, are mostly long-lived."

"It doubtless tends to longevity to have all things growing smoother and easier as age comes on ; so that a youth spent in toil may sweeten old age."

"The thing above all others most pleasing to the spirits is a continual advance to the better. Youth and manhood should therefore be so ordered as to leave new comforts for old age, whereof the principal is moderate rest. And therefore old men in honourable places, who do not retire to a life of leisure, offer violence to themselves."

"Herein, however, two cautions are required : one, that they do not wait till the body is entirely worn out and diseased, for in such bodies all change, even for the better, accelerates death ; the other, that they do not give themselves up to mere inertness, but have something to entertain the minds and thoughts in a quiet way ; for which the best kind of amusement is reading, and next building and planting."

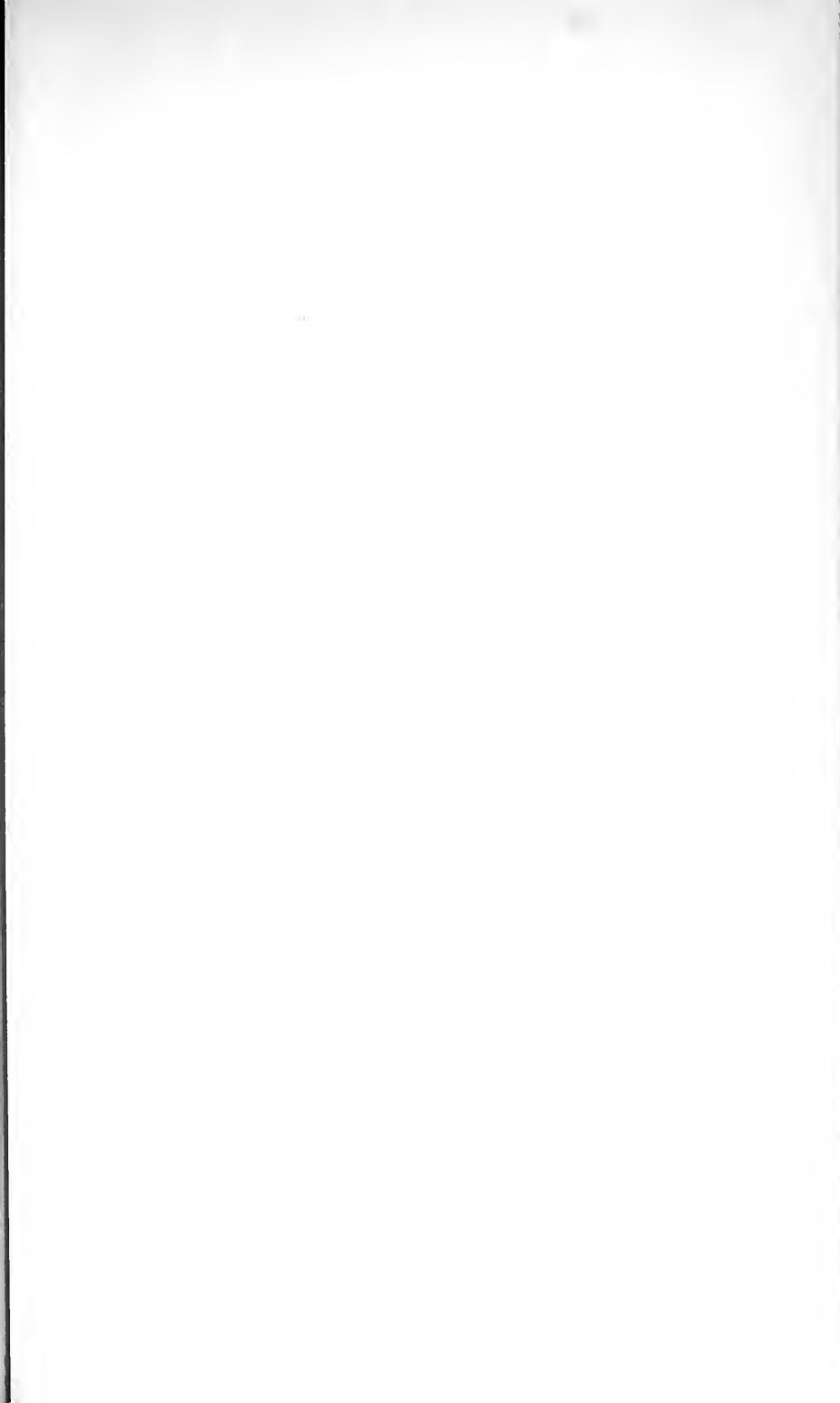
"Lastly, the same action, endeavour, and labour, which if undertaken cheerfully and with good will refreshes the spirits, if it be attended with aversion and dislike preys upon and prostrates them."

THE NIGHT.

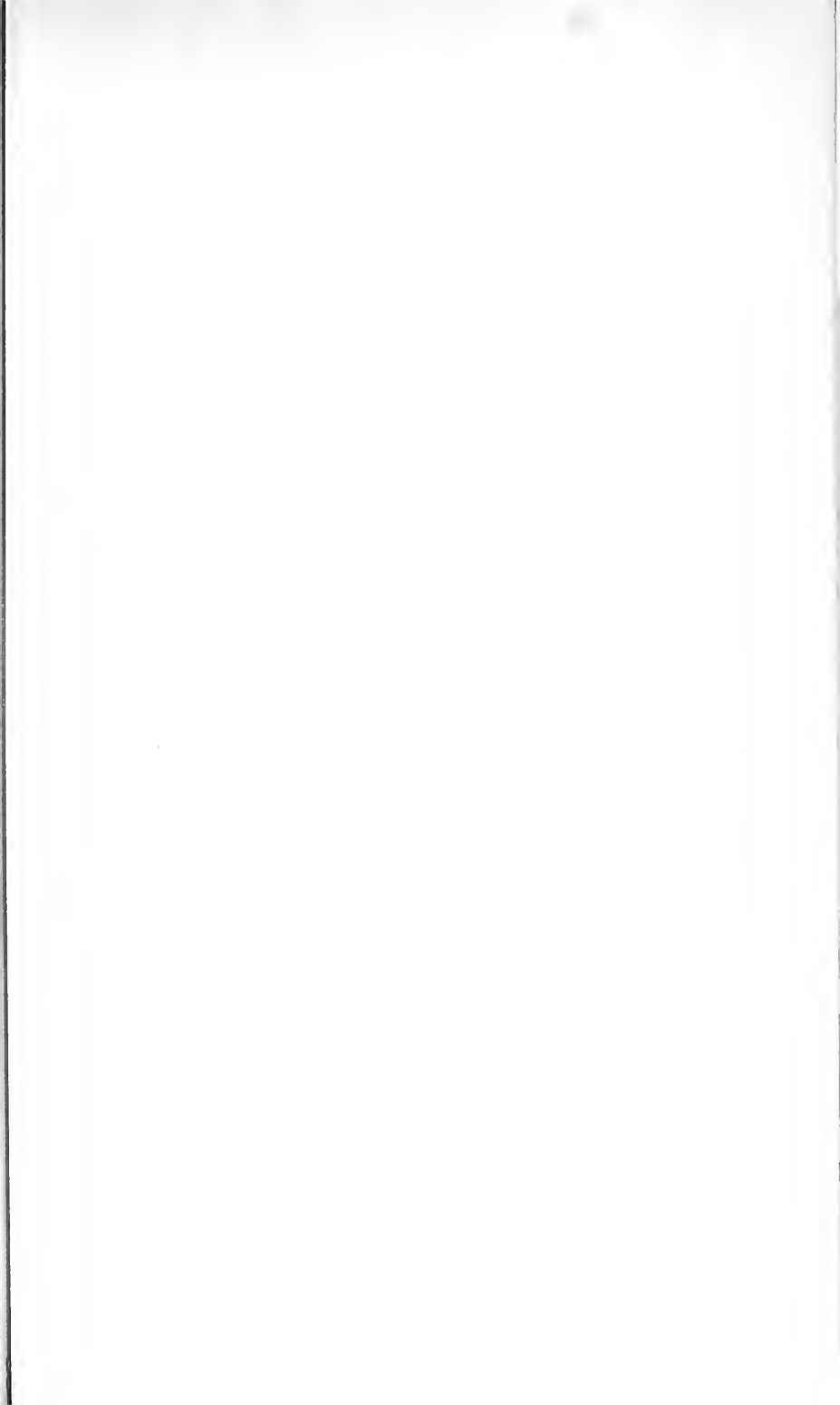
It is characteristic of Bacon as a philosopher who had been "puddering in physic all his life" that his death should be hastened by the performance of a physiological experiment which exposed him to danger. He had received a full pardon from the King after a few years of retirement, and might easily have re-entered public life ; but anxiety, worry, and gout still pursued him, to which was now added the feebleness of declining years. Enamoured of quiet and rest, he sought no more of social distraction. King James died, and the first Charles was ruling in a court to which the first scholar of Europe would have had ready access ; but the temptation was over. In the early part of April 1626, according to Aubrey, who got his authority from Hobbes, Bacon was taking the air in a coach with Dr. Witherborne, physician to the King, towards Highgate. At the time snow lay upon the ground, and it came into the mind of Bacon that flesh might be preserved "in snow as in salt." They resolved to try the experiment, and, alighting from their coach, went into a

poor woman's house at the bottom of Highgate Hill, bought a hen of her, made her eviscerate it, and then stuffed the body with snow, the great ex-Chancellor himself taking part in the process. The snow so chilled him that he immediately felt extremely ill, and could not return to his lodgings, probably then at Gray's Inn, but went to the Earl of Arundel's house at Highgate, where he died on the 9th of April of a "gentle fever, accidentally accompanied with a great cold whereby the defluxion of rheum fell so plentifully upon his breast that he died by suffocation." In our modern language he died of congestive bronchitis and hydrops bronchialis. Practically he was an old man, and fell quickly, according to his own dictum, that "old men are like ruined towers," fair to look on, and strong, but ready to fall. His death illustrates also another of his sayings, that "heat and cold are the two hands of nature." He fell by the cold hand.

When the works of Sir Francis Bacon, Baron of Verulam and Viscount St. Albans—for he never was Lord Bacon, though he is often called so—are before the reader or commentator, it is difficult to know where to stop either the reading or the commentary. But addressing myself this time to the student and future representative of medicine, I think there is one passage which of all others is best. It is that in which it is said that "envy is the worst passion, and so much the worse because it is always at work and keeps no holidays." This is a truth which throughout my life I have always observed. I have seen more men fall from envy than from any other passion, and the lesson I gather from the observation, and would proffer from it, as I lay down the pen, is that which Sir Francis Bacon inculcates: namely, that whenever envy endeavours to begin its work in any student's heart he should keep it out by giving it no room to enter, and by continuing, as Bacon did, at work, work, work, on his own account with nature and with no other competitor; assured that—"Man, as the minister and interpreter of nature, does and understands as much as his observations on the order of nature, either with regard to things or the mind, permit him, and neither knows nor is capable of more."









R Richardson, (Sir) Benjamin
134 Ward
R5 Disciples of Aesculapius
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